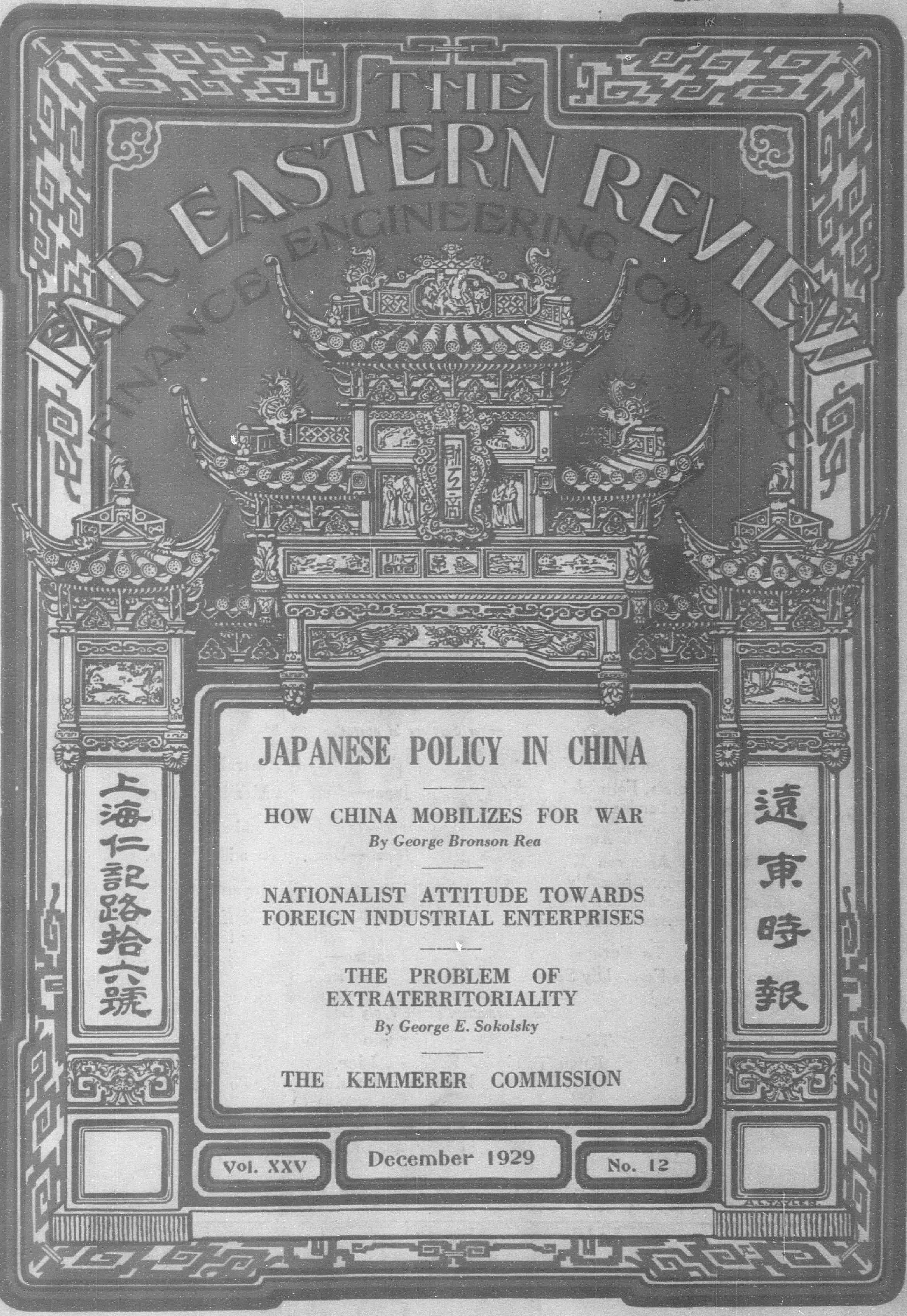
YALE UNIVERSITY
JAN 28 1930
LIBRARY.



遠東時報
上海仁記路拾六號
A. L. TAYLER

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

JAPANESE POLICY IN CHINA

HOW CHINA MOBILIZES FOR WAR

By George Bronson Rea

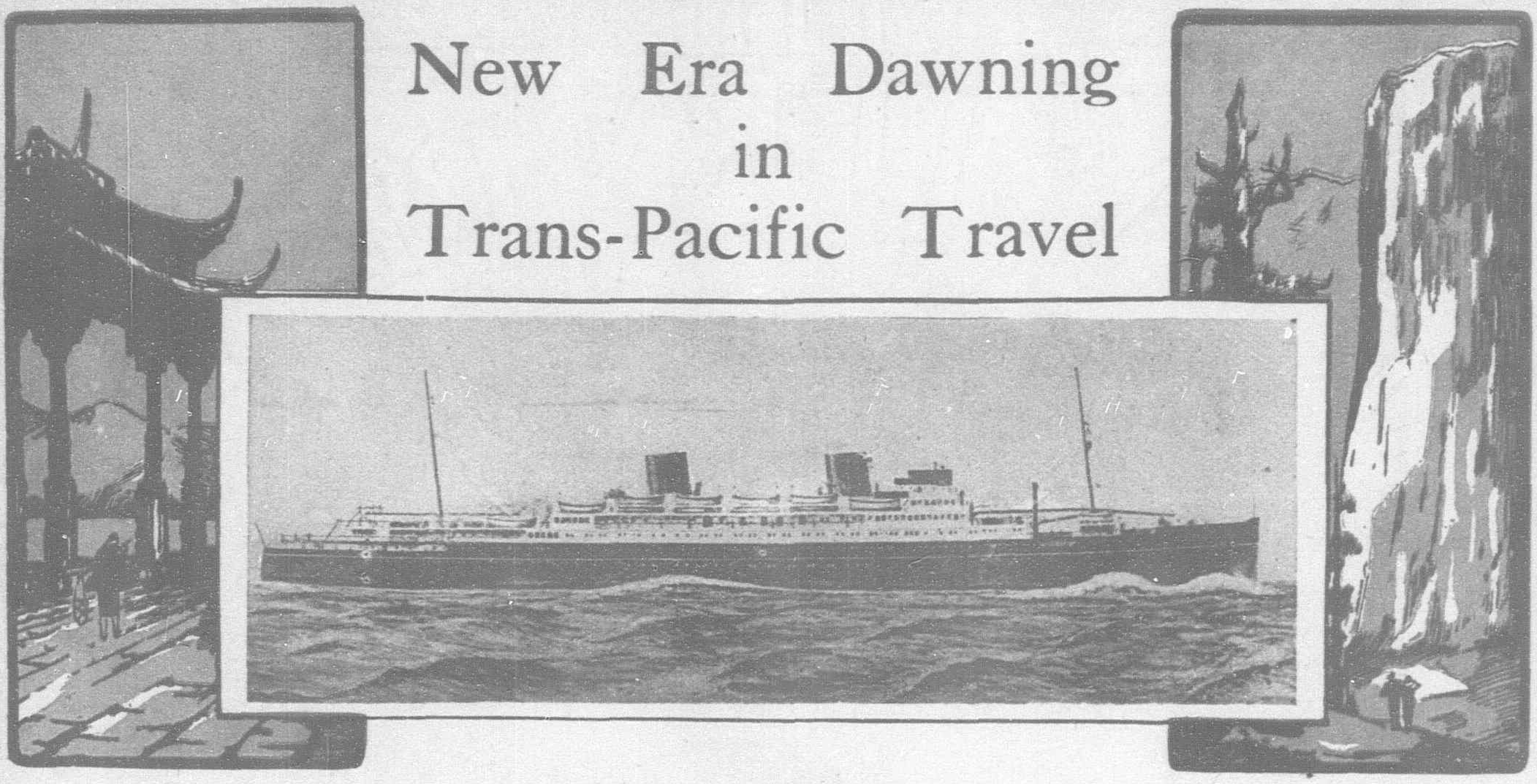
NATIONALIST ATTITUDE TOWARDS FOREIGN INDUSTRIAL ENTERPRISES

THE PROBLEM OF EXTRATERRITORIALITY

By George E. Sokolsky

THE KEMMERER COMMISSION

Vol. XXV December 1929 No. 12



New Era Dawning in Trans-Pacific Travel

One of the Transcendent Trans-Pacific Trio ordered by the N. Y. K. Line to be commissioned in their Orient-California Fortnightly Service in 1929.

Details of the Transcendent Trio:

Quadruple Screw Motor-driven Passenger Liners.

Tonnage	16,500 gross tons, 22,000 displacement tons
Length	560 feet
Speed	19 knots

These vessels will embody the highest ideal of a passenger carrier and are expected to revolutionize the passenger traffic on the Pacific.

Principal Passenger Services in operation:—

To North America

Orient—California, Fortnightly Service.
Orient—Seattle Service, Fortnightly Sailings.

To South America

Orient—South American West Coast Service, approx. Monthly Sailing.
Orient—South American East Coast Service, approx. Monthly Sailing.

To Europe

Japan—Europe Fortnightly Service.

To Australia

Japan—Australia Monthly Service

To Bombay

Japan—Bombay Monthly Service.

To Japan

China—Japan Rapid Express Service, sailings every four days.
Tsingtao—Japan Semi-monthly Service, etc., etc.

For information, please apply to

Shanghai
31 The Bund

Tsingtao
20 Kuan Tau Road

Tientsin
K. Y. K. Line,
French Concession

Hongkong
King's Building,
8, Connaught Road

N. Y. K. LINE

Head Office: Yusen Building, Tokyo

The Far Eastern Review

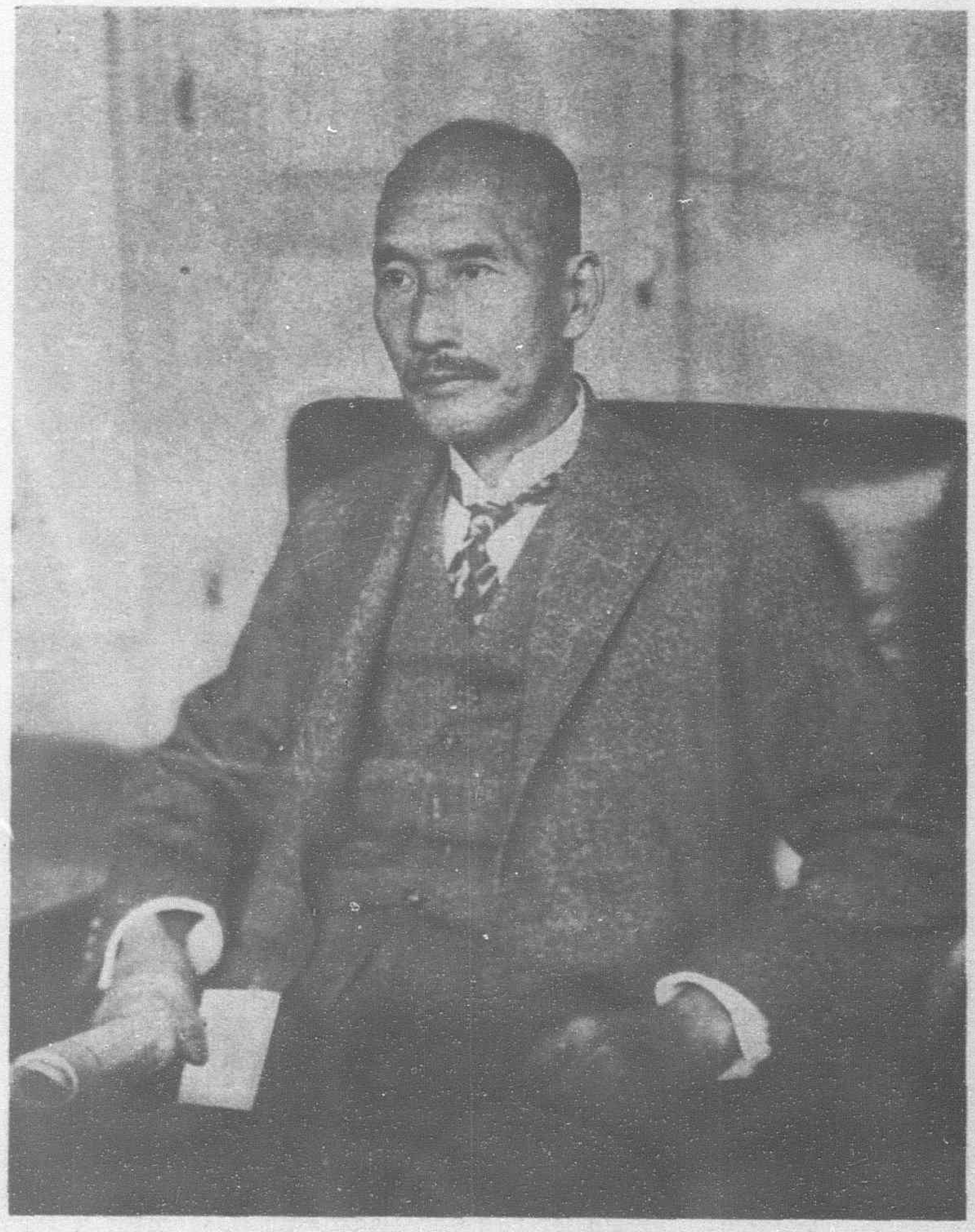
ENGINEERING FINANCE COMMERCE

Vol. XXV SHANGHAI, DECEMBER, 1929 No. 12

Japanese Policy in China

The untimely death of Sadao Saburi, late Japanese Minister to China, was even more a public than a private calamity. Few Japanese have fired the imagination of the Chinese people as had Mr. Saburi. Of him, the wonder of wonders was expected, that is, an early settlement of the Sino-Japanese imbroglio on a basis as favorable to China as to Japan. His great personal charm, his frankness and independence of thought, his love of truth, his historical sense created an atmosphere of co-operation and friendship among peoples. Mr. Saburi did not seek appointment to China, but he accepted the post when it came to him, because he felt that he owed it to both nations, to Japan and to China, to make an attempt to find a workable solution. Perhaps his tragic death was due as much to the disappointment which he envisaged as to the loneliness of spirit from which he suffered. Had Saburi lived, not even a Chinese Minister of Foreign Affairs could have convinced his people that the Japanese minister was insincere, for no one would have believed him. And no Japanese can hope to find as great a welcome in China nor such an advantageous atmosphere—therefore, Mr. Obata, his successor finds opposition rising among the inspired masses of China, even before his arrival in this country. Mr. Obata and the Japanese Government must realize that any successor to Mr. Saburi would have proved disappointing to the Chinese people and they must act accordingly.

The opposition to Mr. Obata takes the form of a reminder that he was Secretary of the Japanese Legation in Peking during the presentation of the Twenty-One Demands. Mr. Torikichi Obata has had a singularly brilliant career in the Japanese Foreign Office. He served at Tientsin, Singapore, Vienna and London. He was Secretary of Legation at Peking in 1905 for a long period. He was Consul at Tientsin and Chefoo and was Counsellor at Peking and then Director of the Political Bureau of the Foreign Office from 1915 to 1918. Finally, he was Japanese Minister to China from 1918 to 1922. In recent years, he has served as Japanese Ambassador in Turkey. His experience in China then has been continuous from the Russo-Japanese War, through the Great War period, through the Twenty-One Demands Period, to the Washington Conference and Rendition of Shantung period. If he participated in the Twenty-One Demands as a secretary, he also participated in the Rendition of Shantung as a minister. It is foolhardy to suggest that his activities with regard to the Twenty-One Demands as a subordinate are to be regarded as more important than his negotiations with Dr. C. T. Wang for the rendition of Shantung when he was a principal. Nor, can the Chinese ignore his subsequent career at Constantinople, where he witnessed those very political changes which the Chinese hope to achieve in their own country. To assume that Mr. Obata is an enemy of China is contemptible and ridiculous.



Ambassador T. Obata

No outstanding leader of Japan is an enemy of China. The Japanese are as anxious to find a solution as are the Chinese. The Japanese cannot afford a "sick" and disorderly neighbor. Japan has indicated beyond any possibility of doubt, her willingness to assist China, particularly the present Government of China, to maintain an orderly and stable Government. It has become fashionable in China to attack the Tanaka Government and Dr. David Yui showed singular ungraciousness and bad manners to bring his pique to Kyoto where men sought peace not recriminations, but the fact remains that **even the Tanaka Government agreed to an increase in China's tariff duties on the basis of the Soong-MacMurray Treaty without waiting for the signing of the Sino-Japanese Commercial Treaty. Japan met China more than half way, when it came to a clear-cut issue upon which Japan and China could agree and in which only Japan had a sacrifice to make.**

The attitude towards the Twenty-One Demands, however, requires revision in view of the position taken by Dr. Sun Yat-sen towards them. It is the policy, one might almost say, the religion of the Kuomintang and therefore the present Government of China to accept the dictum of China unimpaired and as absolutely correct. Dr. Sun Yat-sen in many private conversations and at least in one public utterance declared that the Twenty-One Demands were not imposed upon China by Japan but that the then existing Chinese Government requested that Japanese Government to issue the ultimatum as part of Yuan Shih-kai's attempt to make himself emperor of China. In the Astor House in Shanghai at a dinner given in honor of American members of Congress, Dr. Sun Yat-sen delivered an address in which he made a lengthy statement to that effect. His address was published in the press of Shanghai, particularly in the *Shanghai Gazette*, which was his personal organ and which was published by Mr. Eugene Chen, who acted as his English Secretary. If Dr. Sun was correct, and every Kuomintang member and every official of the present Nanking Government must assume that he was correct, then China as much as Japan is responsible for the Twenty-One Demands, for China must assume responsibility for the acts of any one of the Chinese Governments which preceded the present one. As none of the clauses of the Twenty-One Demands, except those relating to Manchuria, have any effectiveness whatsoever, it would be just as advantageous to China as to Japan to wipe them out and forget them as an ugly nightmare. The Manchurian clauses will have to be settled some day in some way, but thus far they have proved an advantage to China even more than to Japan, for were the Japanese to-day not in Manchuria, Russia would surely be there and whereas Japan has never questioned the political sovereignty or the territorial integrity of China wherever Russia has come, she has stayed; whenever Russia has taken territory, she has made it part of the ever-increasing Russian Empire. This is as true of Soviet Russia as it was of Tzarist Russia.

There is the further question of certain politicians utilizing the Sino-Japanese difficulties for the diversion of attention from internal Chinese politics to international affairs. Every time there is a crisis in China, some politicians stirs mass opinion against Japan, because it is so easy. There can be no question but that historically Japan has been accepted by the Chinese people as the objective enemy. The reasons for this attitude are not far to seek. Japan was a small and unimportant nation which the Chinese regarded with the contempt of a great empire towards an island people. In a matter of two decades, Japan became sufficiently powerful to defeat China in a swift war which resulted in the payment of a huge indemnity by China and in the loss of territory, not so much to Japan as to European Powers who took advantage of the revealed weakness of a country which had once been regarded as a tremendous power. Subsequently, the Japanese defeated Russia and took from Russia her rights in Manchuria. In the course of fifty years, Japan became one of the five principal powers of the universe, equalling in importance, at the Versailles Conference, the United States, Great Britain, France and Italy.

To the Chinese, the comparatively sudden rise of Japan was a startling fact. The Chinese do not realize, cannot realize that Japan's position was won by **discipline, hard work and a realistic concentration on facts.** The Chinese will not accept Japan at the valuation which the rest of the world places upon the Japanese Empire. To China, the Japanese are still an island people, small and unimportant, who have had some good fortune and who are succeeding in the world only because of China's misfortunes. This attitude taxes the patience of the Japanese and makes understanding impossible. In this idealistic and exceedingly stupid conception of world politics and Sino-Japanese Relations, China has been encouraged by selfish and mercenary foreigners who have an interest in Sino-Japanese enmity and who would be without the *raison d'etre* if peace were wholly assured in the Pacific. The most virulent of these fomenters of strife is Doctor Tom Millard who is the propagandist of the Chinese Ministry of Foreign Affairs in the United States. Such men live on enmities and boycotts; peace, good-will, prosperity and friendship leave them without jobs. They thrive in destructive phases; a constructive era gives them no opportunities. Those who seek peace between China and Japan are distrusted as Japanese propagandists, while China alone suffers from the deceits and falsehoods of those who would keep two neighborly nations at war.

Another fact that most Chinese fail to realize is Japan's international position and that China is no longer the principal factor in Japan's policy. For instance, at the present moment, Japan is meeting with the principal Powers of the world to discuss naval disarmament, a question which does not, except very remotely, affect China. Japan has become part of the machinery of control of the peace of the world. In the League of Nations, in the World Court, in the Disarmament Conferences, Japan plays a rôle of primary importance. Japan's foreign trade is constantly increasing in countries other than China. In the South Seas, in India, in the Levant, in East Africa, Japan's mercantile position rises in importance every year. *Japan's task is to keep her own peace and to maintain the peace of the Pacific that her trade might prosper. That has been the consistent foreign policy of Japan since the Washington Conference. That is Japan's foreign policy to-day.*

China can ill-afford, in her present circumstances, to antagonize Japan further and to risk further misunderstandings between the two peoples. China can utilize all the friendship she may be able to engender. The misguided foreign policy of the present Government has alienated American faith in China's future; public sentiment in Great Britain was clearly indicated in the addresses in Shanghai of Mr. Malcolm MacDonald and Lord Hailsham, Laborite and Conservative, who warned China against hasty unilateral actions with regard to extraterritoriality; Soviet Russia has become the bellicose enemy of Nanking—to whom shall China turn for friendship? No nation can stand alone. No country can attempt to make herself heard in the councils of nations without some friendly support. Japan has been proffering friendship, on a sane, rationalistic basis, which politicians have spurned only to help their own political games, but which statesmen are bound to accept, for therein lies wisdom and sound policy.

The experience and wisdom of Mr. Obata makes him a worthy successor to Mr. Saburi. He knows China. He has had a vast experience with China's present Minister of Foreign Affairs. In the negotiations for the Rendition of Shantung, Mr. Obata showed definite and unmistakable friendship for China. He understands the Chinese people and he will be guided by a Japanese Minister of Foreign Affairs, Mr. Shidehara, who seeks everlastingly the peace of Asia. Who in Japan could be a more worthy successor to Mr. Saburi?

China Mobilizes for War

The Boycott as an Instrument of National Policy

By GEORGE BRONSON REA

THE wars of the past were fought and decided by mobilized armed forces on land and sea; the wars of the future will be won by the mobilized industries of the nation which has the wealth, resources and power to crush or ruin the economic life of the enemy. Navies will be limited to a force sufficient to protect trade routes or blockade the enemy's ports. Armies will be reduced to a minimum for national defense. Disputes between nations that cannot be settled amicably by conciliation, arbitration or adjudication will lead to a severance of diplomatic and economic relations. War will go on. We may renounce war as it has been practiced for ages as an instrument to settle international disputes or to right wrongs, but in some form or other the stronger nation will impose its will upon the weaker. What then, is the difference between war waged through an unofficial "discontinuance of economic relations" and an official declaration of hostilities that accomplishes the same result?

Is a government justified in secretly organizing and carrying on a trade boycott to enforce acceptance of its viewpoint, before exhausting every other means of conciliation? There may be a technical distinction between sinking an enemy's merchant ship on the high-seas and confiscating or destroying its cargo after permitting it to be landed, but for all practical purposes, the result seems to be the same. Sinking the enemy's ship on the high-seas is justifiable only after a formal declaration of war: Confiscating their cargoes after permitting them to land and exacting customs and other duties, is legalized piracy, highway robbery, a complete breakdown of international law, a provocation to hostilities and retaliation.

China's chronic instability and inability to discharge her international obligations by extending protection to the lives and properties of foreigners, has at times reluctantly compelled other Powers to dispatch their own armed forces to ensure that protection. Whether this constitutes a violation of the sovereignty of the weaker nation or an invasion of its territory is a question that may not be clearly defined by international law, but it is and will remain an obligation that all self-respecting governments must assume. In a country like China, where the mob instinctively turns on the foreigner in moments of internal disorders and the authorities are powerless to provide protection, that duty devolves upon the armed forces of the nationals involved. The landing of such forces does not necessarily constitute an act of war against China or a menace to her sovereignty. If the action has been precipitate or without sufficient provocation, the remedy lies in taking the case before the World Court. China, however, has invariably insisted upon acting as the sole judge in such matters. Unable, by reason of her military weakness to enforce respect for her viewpoint, she has resorted to the economic weapon to make her protests felt. In nearly every instance where China has brought her case before an international conference, the Powers have done their best to concede her full equality. All that they have asked in return is that China shall put her house in order and extend to foreigners the same guarantees of law and justice that Chinese resident in other countries enjoy.

That China has been permitted to wage an economic war against her "enemies" without provoking reprisals is perhaps the strongest evidence of forbearance and patience on the part of the interested Powers. The evidence submitted to the Kyoto Conference by the Japanese Delegation concerning "The Boycott in China" discloses a state of affairs that indicts the Nationalist Government of connivance and participation in a campaign in which masses and groups of men have illegally and systematically interfered with the lawful trade of the Japanese, jeopardized their freedom of domicile and, in many cases, detained or confiscated their merchandize. The Chinese authorities made no effort to stop the outrages committed by the mobs upon the persons of Japanese traders or the inoffensive Chinese purchasers of their goods, nor did it interfere in any way with the wholesale fines (reaching into total of millions of dollars) imposed by the Anti-Japanese Associations upon Chinese handling Japanese goods.

Japan's case against the use of the Boycott was fully and clearly set forth in a Memorandum issued by the Japan-China Economic Association, with an introductory letter signed by Viscount Shibusawa. No disinterested person can read that document without reaching the conclusion that the principles involved are of such grave and immediate importance that action by the League of Nations becomes imperatively necessary to determine just how far a Member Nation can, on its own initiative, resort to weapons that the League itself reserves the right to employ in enforcing its mandates. The issue, if permitted to drift, must sooner or later precipitate grave international complications, for, not only does China arrogate to herself the right to sever economic relations and prosecute a trade war within her own territory, but has encouraged her merchants in other lands to wield the boycott weapon in order to penalize and destroy the trade of her "enemies." The last boycott against Japanese goods was rigidly enforced in every country where the Chinese trader is established. The intensity of the boycott in China was actually surpassed by the violence of the movement in the Straits Settlements, Federated Malay States, Siam, Netherlands Indies and the Philippines, thus carrying the war into neutral countries, where, by reason of their dominating commercial position, the Chinese were able to enforce their policy. In countries like the Philippines where the Chinese practically control the retail business and, to a large and increasing extent, the export trade, it is not difficult to see, how, under certain conditions, a very grave situation might be created between Japan and the United States. If retaliatory measures were adopted by Japan, they might well involve the trade of those nations which permit the Chinese to violate their territory in waging an economic war against the enemy of the moment. In open warfare, the United States, Great Britain, Siam, France and Holland, would remain strictly neutral and if necessary, defend their neutrality by force of arms. Yet these same governments acquiesce without a challenge, without a protest, without any attempt to enforce respect for their sovereignty, in the violation of their territory by the nationals of another country in waging an economic war upon a friendly nation.

If, as the Japanese at Kyoto forcibly and convincingly pointed out, China has renounced open warfare as an instrument of national policy in favor of the more silent but equally disastrous economic weapon, then any extension of this warfare into other countries, is as much a violation of their neutrality as though it was trampled upon by military force. There can be no two opinions on the gravity of this situation. The continued application of the boycott as an instrument to settle international disputes is not only highly provocative, but an insurmountable obstacle to permanent international peace. Fortunately, Japan has refrained from taking retaliatory measures to protect herself, but if the Chinese continue their efforts to ruin her commerce and carry their warfare into nearby neutral countries, a situation will sooner or later be created that will force the question into the World Court. Of what avail is the Kellogg Pact or the League of Nations, if one of the signatories or Member States deliberately takes the law into its own hands and precipitates a state of hostilities by resorting on its own initiative, to the only alternative to open warfare to enforce compliance with its policies or to penalize a nation with whom, it may have a diplomatic dispute ? The continued use of the boycott weapon for the purpose of destroying the commerce of a friendly nation nullifies the Kellogg Pact and every other instrument for the prevention of war.

For the moment, the use of this weapon is confined to penalizing Japan for the Tsinan incident, but it may be invoked to-morrow for the settlement of the Manchurian question, or wielded with equally disastrous effect against any other nation which incurs the ill-will of the Chinese Government or people. It is well to recall that the weapon was first wielded by China in May, 1905, against American trade as a protest against the restrictions imposed upon the entrance of Chinese into the United States in the new Sino-American Treaty of that date. That boycott also extended to every country in the Far East (including Japan) where Chinese merchants were established. The boycott against American goods assumed such proportions that it practically paralyzed American trade with the Orient and threatened to develop into a general anti-foreign movement. To such an extent did this phase of the situation develop, that all the consuls in Shanghai, alarmed at the possibility that the movement might endanger the commercial interests of all foreign countries, united in a protest to the Diplomatic Body at Peking and to the Chinese Government. Only after repeated warnings did the Chinese authorities awaken to a sense of their responsibility, but it was not until September that an Imperial Edict was issued pointing out that the American boycott was injurious to the maintenance of friendship between China and the United States. In those days the Imperial Edict was respected and the boycott ceased as suddenly as it began. It is difficult to state what might have happened had the boycott been continued. The American Government was in no mood at that moment to surrender to the Chinese, the feeling against China being intensified by the agitation against the Canton-Hankow Railway Concession and its cancellation by Peking in the face of Roosevelt's promises that it would remain American.

No intelligent American labors under the delusion that the Chinese are any more satisfied to-day with our Exclusion Act than they were in 1905. It is almost a certainty that as their Government becomes stronger and more aggressive it will again raise the issue, especially as regards the free entrance of the Chinese into the Philippines. If, and when, this issue is precipitated, and the American or Philippine Governments decline to accept the Chinese viewpoint, it is not difficult to forecast what will happen. If the Chinese retail shops throughout the Philippines should close their doors for a month as a protest against the Exclusion Laws, the people of the Islands would starve, or, the authorities would be compelled to commandeer their stocks. Conditions, however, have changed since 1905 and it would be difficult and dangerous for the Chinese at this time to try to intimidate the American authorities. They have given hostages for their good conduct. At the first attempt to wage an economic war against American goods, their business in the United States would come to a standstill. In New York City alone, there are over 300 Chinese restaurants doing an annual business aggregating $70,000,000. It is not far from the mark to state that the Chinese in the United States are doing an annual business totalling $300,000,000 or three times the value of America's exports to this country.

If the United States should adopt retaliatory measures, and round up every Chinese resident in the country to determine who are there illegally, it would result in wholesale deportations and the ruin of their vast business interests in that country. The periodic outbreaks of tong warfare in the leading American cities has already compelled the police to make all preparations for such a round-up and in the present temper of the American people against gang murders and floutings of the law, any attempt of the Chinese to impose a boycott against American goods would be met with swift retaliation. The same methods would be employed to combat any continued boycott or economic agitation in the Philippines. A Chinese boycott against American goods would therefore result in inflicting more damage to the Chinese themselves than to Americans. Some American firms in China might feel the pinch, but the loss of the entire American trade with China would not cause a flutter on the stock market.

It is interesting to learn from the Japanese Memorandum that the anti-Japanese boycotts of 1928-29 had no effect on the gross volume of Japan's exports to China which increased from 487 million yen in 1927 to 541 million in 1928. The total for the first six months of 1929 shows a decrease of 12 million over the corresponding period of 1928 but an increase of 31 million over the same period in 1927. The memorandum points out that although these figures indicate that the general trade situation was not affected, it must be borne in mind that in view of the increase of China's foreign trade in 1928 over that of the preceding year, Japan's share of the imports for 1928, though showing an increase, was, in reality, a relative decrease of 3 per cent. from the preceding year.

Japan's exports to China (excluding Hongkong) divided by districts for the years 1927 and 1928 is given as follows (in Yen 1,000,000):

	1927	*1928*
Manchuria..	150	185
North China	105	104
Central and South China	170	195
Total	425	484

These figures indicate that Manchuria was unaffected by the boycotts but North China suffered a slight decline. As regards Central and South China, Japan's exports showed an unprecedented increase in the first five months of 1928, which more than offset the decrease for the rest of the year caused by the boycott which took effect in June. The figures for the remaining months of the year show Yen 96 million against Yen 120 million for the corresponding period of 1927, a decrease of Yen 24 million.

The effect on the more important commodities exported to China from Japan during the continuance of the boycotts up to the year ending June, 1929, as compared with the preceding year given in percentages, are as follows:

Decrease: Cotton Tissues, 6 per cent; Yarn, 1 per cent; Refined Sugar, 1 per cent; Marine Products, 1 per cent; Coal, 4 per cent; Beer, 1 per cent; Knitted Goods, 1 per cent; Porcelain and Earthenware, 1 per cent; *Increase:* Paper, 3 per cent; Wheat Flour, 20 per cent; Silk Tissues, 4 per cent; Woollen Tissues, 2 per cent; *Stationary:* Lumber, Glass and Iron.

The effect of the boycott upon Japanese merchants in China subjected the lesser firms to considerable difficulties compelling them for a time to suspend or postpone their payments, though at Shanghai, the relief measures adopted by the Japanese banks prevented the occurrence of bankruptcies. The damages are classified as follows:

1. Non-fulfilment of contracts on the part of Chinese merchants.
2. Damages due to accumulation of stocks—including interest, storage, insurance, charges on deferred bills, and loss of profits due to recourse to special financial accommodation.
3. Damages due to inability to collect on sales.
4. Damages due to decrease of volume of sales.
5. Damages due to forced sales to meet financial necessities.
6. Damages due to speculative stocking in order to continue the business or, for financial reasons.
7. Stoppage of inquiries for new business.
8. Damages due to the detention or confiscation of merchandise in transit.
9. Damages due to the appearance of substitutes and loss of markets.
10. Damages due for the infringement of trade-marks or to the abandonment of established chops.

The effect of the boycott on the Japanese merchants and industrialists in Japan was practically *nil* as the larger and more important trading firms are international in character, making up in other directions for their losses in China. The smaller manufacturers in Nagoya and Osaka, numbering several hundreds, interested in miscellaneous goods for the China and South Seas markets were however hard hit and compelled in many instances to suspend business. The numerous employees and other people working under contract with these latter concerns have been deprived of their means of subsistance.

The conclusion is reached after reading the Japanese memorandum, that although the boycott failed to affect seriously the volume of Japan's trade, it did succeed in injuring the economic existence of a large number of smaller traders and manufacturers concerned exclusively with the minor articles of China trade. The Japanese have been very frank in stating the exact extent of their losses and it would be enlightening for the rest of the world to know just what the Chinese have gained by the boycott, other than to raise an issue that will in all probability be brought before the League of Nations at an early session.

It is apparent that no country so delicately balanced economically as Japan can afford the luxury of retaliation against such a boycott. An industrial nation dependent upon outside sources for raw materials and markets for its manufactured products, must continue to keep the machinery of trade moving and try to make up in other markets what it loses as the result of a boycott. China's repeated attempts to force her viewpoint upon Japan by economic pressure has simply resulted to date in losing a good customer and stimulating Japan to find new outlets for her manufactured products. No longer is Japan dependent upon China as a market. In 1920, when the boycott was applied against Japan over the Shantung incident, her exports to this country totalled 45 per cent. of the whole. To-day, as the result of continued economic pressure on the part of China, Japan's trade with the country is only about 23 per cent. of the total. Of this, over half is with Manchuria and North China where the boycott is not effective. Analysis of the trade statistics indicate that the boycotts in Central and South China affect only about three per cent. of Japan's total trade, sufficient perhaps to cause great suffering amongst a very limited number of smaller merchants and industrialists but not serious enough to cause an economic breakdown or compel the Japanese Government to modify its policy.

The other side of the story remains to be written. No intelligent discussion over the merits of the boycott as a weapon for settling international disputes is of any value without accurate data on how it affects the nation who resorts to it. No responsible government solicitous for the welfare of its people would dare to invite the consequences of retaliation in an economic war without weighing carefully the effect upon its own prosperity. Investigation will doubtless prove that the real sufferers in the many boycotts staged by the Chinese, are the Chinese themselves.

The Chinese have discovered what they consider to be a formidable method of waging war without indulging in actual hostilities, but the general economic condition of the country would seem to indicate that the weapon is somewhat of a boomerang. Yet despite the appalling poverty and industrial weakness, they seem to believe that they can redress all their so-called wrongs and hasten the abolition of the "unequal treaties" by swinging the boycott club over the heads of the other Powers. The Declaration of the National Convention of Anti-Japanese Associations held in Nanking in June, last year, is of special importance at this moment, when the unilateral abolition of extraterritoriality is announced for January 1;

> "Since the May 30 affair (1925), the nation-wide anti-Japanese movement, under the leadership of the Kuomintang, has been pushed most vigorously. During this period an economic blow has been dealt to Japanese Imperialists and they have been made to realize the powerful character of the movement of the Chinese race for its emancipation. *The objective of our anti-Japanese movement is, by energetically pushing the economic rupture with Japan, to bring down and ruin that country. The pressure will next be brought to bear upon the rest of the Imperialist nations with ultimate object of nullifying all unequal treaties,* restore China's international position, encourage domestic industry in order to speed up production so that China will be enabled to combat the economic inroads of the Imperialists by its own economic prowess, and lay

> down the economic foundation of the Three People's Principles. This is our mission. Our responsibilities are grave. Our Association has made its objects clear in order to facilitate its program and has changed its name to the "National Association for the Acceleration of the Abrogation of Unequal Treaties." Its aims and method of operation however, will not be a whit different from before. *We will resort to the same means, as we used against the Japanese Imperialists, against those countries which refuse to cancel their unequal treaties of their own accord, until our just demand is recognized.*"

Although the Nationalist Government claims that the anti-Japanese movements are purely spontaneous and patriotic, and cannot be suppressed, the Japanese Memorandum submits proof that those who instigate, direct and execute these boycotts are all members of the Nationalist Party and, that as the Party is the Government, the latter's contention is somewhat misleading. In proof of this assertion, the Japanese Memorandun discloses the text of secret instructions issued by the Nationalist Government in August 1929, to the Provincial authorities, which reads :

> "The severing of economic relations with Japan is of course attributable to the patriotic motives of the public at large, but the means adopted for the attainment of their end in the past have often been found improper and of a nature to lead to a series of embarrassing consequences. The Societies for Expediting the Revocation of Unequal Treaties established throughout the country are acting against the expressed desires of the Central Government when such societies continue to examine and check Japanese merchandise in their districts and deal out direct punishment to Chinese merchants handling such goods."
>
> "Therefore, the Central Government, with the approval of the Central Executive Committee, prohibits such direct action on the part of the said societies and at the same time ordains that the merchants associations of every district shall hold themselves responsible for "rescuing the country" (from foreign economic aggression), by holding such associations liable to punishment in the event of their failure, in spite of well founded incriminatory information, to inquire into and deal adequately with every case of wilful transactions in Japanese goods by individual merchants. By this, all further embarrassing consequences of direct intervention by the Government authorities may be avoided, while the major purpose of severing economic intercourse with Japan may be efficiently served."

The Chinese delegates at Kyoto declined to comment upon or challenge the authenticity of the above official instructions, so they must be accepted at their face value. The above documents reveal that the Chinese have secretly mobilized for waging war upon those nations who refuse to consent immediately to a unilateral abrogation of the treaties. If they carry out their threats, a state of war will be secretly declared on and after January first against Great Britain, the United States, Japan, France, Italy and the lesser "Imperialist" nations who persist in exercising their extraterritorial rights. China will again employ her favorite economic weapon to enforce compliance with her viewpoint. But, war is war, and the other side can also fight with the same weapons. If they should retaliate, it will go hard with many foreign firms in China, but in the end, China will go down to a defeat just as certain and as disastrous as though she had appealed to the force of arms.

The irony of it all is seen in the deplorable economic condition of the country and its poverty-stricken and starving people. China is no more competent to wage an economic war than she is to fight against modern arms. She has been permitted and perhaps encouraged to indulge in these periodic outbursts, simply because rival trading nations have profited by the boycotts against America, Great Britain, Japan or some other "enemy." In this, China has simply followed her traditional tactics of playing one nation off against the other. Temporary gains accruing to the unboycotted traders have blinded them to the fact that their turn may come next. As long as the Chinese confine their warfare to one nation at a time, they may succeed after a fashion in inflicting serious economic damages on the enemy of the moment to the sole advantage of the neutrals. In the case of Japan, she has forced that country to seek elsewhere a constant supply of necessary raw materials (thus losing a good customer) and to build up new markets for her manufactured products. Viewed from this angle, it might be fairly said, that the prolonged anti-Japanese boycotts in China instead of ruining Japan economically has, by stimulating the initiative of her traders, contributed in no small measure to the marvellous efficiency of their organization and conquest of other markets.

Japan has perhaps lost business that, because of her geographical position and other natural advantages, might have been handed to her on a silver platter, but she has gained in creating and developing that spirit of self-reliance, independence and aggressiveness, without which she would go under in the struggle for existence. In attempting to ruin Japan by economic pressure the Chinese have helped to build up a formidable commercial rival to Great Britain, America, Germany and the other Western trading nations.

British firms in China may have benefitted from the numerous anti-Japanese boycotts but their principals at home have paid for it a hundred-fold by forcing Japan into India, Africa and the Near East to find her markets. The United States are now the most profitable outlet for Japanese products. Her merchants are building up an extensive trade in South America. How much has the Chinese boycotts against Japanese goods profited America or Great Britain ? If the ledger is ever balanced, it will show that the real sufferers from these boycotts, outside of China herself, are those nations whose favorite markets have been invaded by the enterprising traders of Nippon, upon whose shoulders rests the economic existence of the Empire.

Nationalist Attitude Towards Foreign Industrial Establishments

By *GEORGE BRONSON REA*

WHAT is the real attitude of the Nationalist Government towards foreign industrial establishments in China ? What guarantee can China give to the foreign investor that after his capital has erected new industrial plants, they will not be boycotted or subjected to sabotage and labor troubles incited by political agitators ? There is every evidence that two conflicting forces are at work in the country ; the conservative business and financial element headed by such leaders as Ministers T. V. Soong and Sun Fo and their associates, who sincerely desire to see the resources of the country developed with the aid of foreign capital, and the extreme radicals who place every impediment in the way of profitable operation of existing plants. It goes without saying that if China persists in applying the boycott weapon against every nation with whom she may have a difference of opinion and permits the radicals to foment strikes and labor troubles in the foreign industrial plants already in operation, she will wait many weary years before new capital will enter the country.

Here again, is an illustration of how futile it is to hold international conferences like the one at Kyoto and bring up for discussion subjects that can only be properly or intelligently threshed out by experts. The Boycott question, next to Manchuria, was the most important subject before the Conference, but so much time was wasted in talking about food, population, art, culture, birth-control, getting acquainted and what-not, that the vital issues when they came up, were sidetracked without comment. Kyoto presented a wonderful opportunity to place the Chinese unofficially on record concerning matters of vital interest to every foreign firm in China. The failure to do so, after deliberately placing Japan on the defensive in regard to her Manchurian policy, is almost inexcusable.

The Japanese business delegates to the Conference, Mr. M. Odagiri, Director of the Yokohama Specie Bank and Mr. T. Funatsu, Chief Adviser to the Japanese Spinning Mills in China, are perhaps the two foremost authorities in the world to-day on certain phases of China's economic and financial problems. Both of these experts raised questions and issues that placed the Chinese squarely on the defensive. For the sake of that international good-fellowship and understanding which these conference are intended to promote, a more courteous attention should have been given to issues that so intimately concern Japan. As it is, we have only the Japanese side of the case and although their statements are fully supported by the newspaper record of events, it is a real pity that the Chinese delegates were not urged and given the opportunity to answer the charges. The Chinese delegates went to Kyoto to tell the world what they thought about Japan. They tried to place Japan upon the defensive but when Japan turned the tables the Chinese had nothing further to say. There was no answer to Mr. Matsuoka's final statement on Manchuria nor was there any discussion of Mr. Odagiri's paper on the Boycott or Mr. Funatsu's statement on the "Labor Troubles of the Japanese Cotton Mills in China."

Mr. Funatsu's paper must be read as a corollary to the memorandum on the Boycott, another indictment of the Nationalist Government's attitude towards foreign investments in China. That it was permitted to be circulated without a challenge or rejoinder is unfortunate for China at a time when every effort should be strained to create a good impression and restore confidence in her credit abroad. The report of Mr. Funatsu is now in the hands of all the delegates to the Kyoto Conference, so some reference to it at this time becomes essential to a proper understanding of existing conditions.

After describing how the occupation of every large city by the Nationalist Army was followed by the organization of the workers into unions, violent labor agitations and strikes, Mr. Funatsu confines his discussion to what came under his personal observation in Tsingtao, where shortly after the city government was taken over by the Nationalists, six of the Japanese owned cotton mills were forced to shut down. These mills employ about 13,500 operatives, which, with their families make a total of about 50,000 people dependent upon them for their existence. After repeated efforts to conform to the demands of the operatives, the mills were finally compelled to suspend operations on August 4. Investigation into the grievances of the workers disclosed that there was no dissatisfaction with wages, working hours or treatment. The workers frankly admitted that they were obeying orders from the union leaders. An exhaustive investigation carried out by the mill management revealed that the labor troubles were directly traceable to the secret activities of Nationalist political leaders using the mill hands in their fight against "foreign imperialism."

The most illuminating part of his disclosures, is what purports to be the policy of the Nationalist Party towards foreign industrial enterprises as set forth in an educational pamphlet for confidential circulation; one of a series of officially prepared text-books for political study, issued by the Executive Committee of the Tsingtao Party Headquarters.

This particular text book is intended to educate the people in the principles of Anti-Imperialism and to point out the "Arch-Enemies of the Nationalist Party." According to the teachings of this pamphlet the arch-enemies of Nationalism are divided into two groups, one within the party and the other out side. The book then goes on to describe the various and devious ways Imperialism employs in subjugating a weaker nation, but we can pass over the lesson on Political and Cultural Invasion and scrutinize the Chinese conception of how an Imperialist Economic Invasion is carried out:

> "In carrying out economic invasion, use is made of financial pressure to drain the country of its wealth. This type of invasion causes more disastrous effects upon our existence than political pressure. The objectives of this invasion may be classified under three heads.
>
> "Under the first, are unjustifiable demands for indemnities and loans secured on public utilities negotiated on unfavorable terms in order to enhance their capital value. The second group includes such acts as the seizure of administrative rights over customs, railways, industries, etc., earning vast profits through importation of merchandise manufactured from materials purchased cheaply in China; investing foreign capital direct in China in order to take advantage of cheap native labor and raw materials; operation of telegraphs, shipping on inland waterways; establishment of industrial plants and operating mines.
>
> "All these foreign activities have adversely affected agriculture and the farmers now find themselves in straightened circumstances. On the other hand, the operation and expansion of Chinese industrial establishments has been a sheer impossibility, no matter how excellent their mechanical equipment or the high quality of their output. In fact, because of these conditions, the Chinese Government revenues have fallen off to such an extent that the only way out of its financial difficulties is to float loans in the foreign markets.
>
> "The third group covers the establishment of foreign banking facilities on a large scale throughout China for the purpose of controlling the monetary and industrial enterprises of the nation. It seems hardly necessary to add that these activities will bring about the utter destruction of our national life after the capitalists of the imperialists countries have possessed themselves of China's finances, industries and other important public and private business."

The Educational and Missionary element would derive considerable food for thought in reading the lesson on Cultural Invasion but we reserve comment upon this for some future occasion.

If the principles taught in this official text-book represent faithfully the true program of the Nationalist Party and are applied and enforced to the letter, the extensive foreign investments in China will be wiped out as soon as extraterritoriality is abolished. Propaganda of the above nature can only awaken distrust amongst the workers of China and engender an intense hatred and hostility towards foreign industrial enterprises.

Mr. Funatsu also quotes the following from a particularly violent anti-foreign booklet, entitled "Blue Light" published by the Labor Union Reorganization Committee of Tsingtao;

> 1. The operation of industrial plants by foreigners resident in China, is an infringement of her sovereignty.
>
> 2.—Foreigners who have invested their capital in industrial plants in China, have put into their pockets all the profits realized, without consideration for the living conditions of the workers. The result is an ever increasing poverty amongst the masses.
>
> 3.—Japan has established many industrial plants in China as a preliminary step towards territorial annexation.
>
> 4.—The reason for the establishment of Japanese industrial plants in China is to be found in the remarkable development of industries in that country in recent years and the need of an outlet for her ever increasing population. In reality, the Japanese are intent upon the annexation of Chinese territory as an outlet for their surplus population.
>
> 5.—In order to meet the costs of erecting these industrial plants in China, the Japanese issue huge amounts of paper money at Home with which to purchase the necessary machinery. They then employ cheap Chinese labor and sell the manufactured product to the Chinese. Every cent of the handsome profits thus earned is sent home in order to "feed the Japanese cubs."

Comment upon the above is superfluous. The industrialization of China is still in its infancy. The possibilities are unlimited. The manufacture of cotton textiles is no exception to the rule. The number of spindles installed in China totals only 3,500,000, of which, 1,300,000 are in Japanese and 200,000 in British owned mills. With its population of 400,000,000 or more, there is ample room in China for further large scale development in this particular industry, but it fair to state that this will never be realized without the financial and technical co-operation of foreigners.

Nationalist principles applied to industry as outlined in the paper of Mr. Funatsu, can only create greater difficulties in the establishment of new plants and drive away the capital so essential for industrial development. If the experience of the Japanese cotton mills in Tsingtau and other interior points under exclusive Chinese jurisdiction, is a fair criterion of what Nationalism means, then it is hopeless to expect American or other foreign capital to embark on such a gamble.

If the Chinese economic pressure was confined exclusively to penalizing and injuring Japanese industrial plants in Tsingtao, some reasonable and understandable explanation could be advanced in defense of their action, but the evidence is before us from a most unimpeachable and authoritative source that the same tactics have been employed to ruin an American company operating a rug factory, unfortunately located outside the foreign concessions in Tientsin and subject to Chinese jurisdiction and police protection.

This is an alarming situation, symtomatic of the internal struggle for power now being waged between the conservative and radical wings of the Kuomintang Party. Although the evidence connecting the Party and Government with these hostile agitations and movements against foreign investments cannot well set aside, it is only fair to state that the Government is as yet too uncertain of its strength to challenge and invite the open opposition of its Radical membership. There is every reason to believe that even the most Conservative leaders of the Nationalist Party will make every effort to encourage the establishment of native industrial enterprises in order to build a source of national wealth and revenue, but that they will deliberately incur the ill-will of foreign investors by destroying their properties, is inconceivable.

Foreign capital must expect and take into consideration before investing in China, the possibility that the Labor element may gain the ascendency in the government and direct the affairs of the nation. As long as this element has no connection with Moscow there is little danger that it will impair or destroy the industrial growth of the country by revolutionary or communistic laws. However, until the permanency and stability of the present Government is assured, it will be difficult, in face of the existing state of affairs, to base any hopes on foreign financial assistance in developing the industries or resources of the country. China's one hope for rapid industrial and financial rehabilitation rests with the personnel of the present Government at Nanking. If it falls, the development and prosperity of China will be set back for another ten years.

* * * *

There seems to be another side to the Japanese case as presented at Kyoto, as there is now ample evidence of a tendency on the part of the Japanese to extend their cotton enterprises in China. Since Mr. Funatsu's report was drawn up, the Nationalist Government has sternly suppressed the labor troubles in Tsingtao and provided adequate police protection against any further sabotage and interference with the mills on the part of the radicals. This has encouraged the Japanese to believe that they will in future be unmolested. This confidence in the good-faith of the Nationalist Government is evidenced by the announcement that the Japanese are to extend their mills in China in anticipation of a decline in their exports to this country as a result of the revised import tariff. It is announced that 10,000 spindles are to be added to the Japanese mills in Tsingtao and 117,544 spindles in Shanghai. With additions to other mills scattered throughout the country, the total increase in spindlage will be over 220,000. The Shanghai mills will also add 8,350 looms to their equipment while an additional 2,500 will be installed in Tsingtao.

It would be unfair to reach any conclusions based on the testimony advanced at Kyoto without taking into consideration these new developments, which go far towards changing the situation and absolving the present Government at Nanking of secretly encouraging any further anti-Japanese agitations or movements against foreign-owned industrial plants.

The Problem of Extraterritoriality

By GEORGE E. SOKOLSKY

In April, Dr. C. T. Wang, Minister of Foreign Affairs, addressed a note to the Powers, in which he suggested that the time had come to abolish extraterritoriality. To this various Governments replied in effect that they were prepared to consider the question but reference is constantly made to the Strawn report. The American Note ends on this *motif*, which is followed in the other notes:

> "Because of its friendship for the Chinese people and its desire, to which allusion has already been made, to relinquish as soon as possible extraterritorial jurisdiction over its own citizens in China, my Government has followed with attentive consideration this entire subject, including particularly the progress which has been made in carrying out its recommendations since the rendition of the report (Strawn Report). It fully appreciates the efforts which are being made in China to assimilate those western juridical principles to which your Government has referred in its note, but it would be lacking in sincerity and candor, as well as disregardful of its obligations towards its nationals, if it did not frankly point out that the recommendations aforesaid have not been substantially carried out and that there does not exist in China to-day a system of independent Chinese courts free from extraneous influences which is capable of adequately doing justice between Chinese and foreign litigants. My Government believes that not until these recommendations are fulfilled in a greater measure than is the case to-day will it be possible for American citizens safely to live and do business in China and for their property to be protected without the intervention of consular courts."

The American note then makes a proposal that a conference be called

> "which would have as (the) object the devising of a method for the gradual relinquishment of extraterritorial rights, either as to designated territorial areas, or as to particular kinds of jurisdiction, or as to both, provided that such gradual relinquishment proceeds at the same time as steps are taken and improvements are achieved by the Chinese Government in the enactment and effective enforcement of laws based on modern concepts of jurisprudence."

No matter what subsequent notes may say, the above is the basis upon which the abolition of extraterritoriality must proceed. In effect, it means that the United States desires that extraterritoriality shall be abolished, but it puts it up to China to create conditions which will make such abolition politically feasible. Instead of meeting this problem rationally, Dr. C. T. Wang announced that extraterritoriality would be abolished unilaterally on January 1, 1930. His announcement unfortunately came at the same time as the Chinese Eastern Railway trouble and served to crystallize public sentiment throughout the world against China. Press comment in the United States, Great Britain, Japan and other countries has indicated beyond a shadow of a doubt that such unilateral abolition would be regarded everywhere as an offensive action. British and American delegates at the Kyoto Conference, most of whom were favorably disposed towards the general principle of the abolition of extraterritoriality opposed the unilateral declaration as a step which would do China infinitely more harm than good.

Doctor Tom Millard, propagandist of the Ministry of Foreign Affairs in the United States, delivered an address to the Shanghai Tiffin Club in New York in which he intimated that although the Nationalist Government would declare extraterritoriality abolished on January 1, it would mean nothing and cited the abrogation of the Sino-Japanese Commercial Treaty as an instance of a meaningless act. It is impossible to believe that a great nation can take a meaningless act. It is impossible to believe that Doctor Tom rightly represented the views of his principals.

Meanwhile on September 5, Dr. C. T. Wang issued another note to the Powers in which he reiterated his general principles and adopted a tone of requesting that extraterritoriality be abolished not so much as a right but as a favor to the Chinese people. The British and American Governments replied to that note but the replies have never been published. Why they were not published, no one knows. All other notes on the subject have been published. It is to be presumed that here secret diplomacy intervened so that neither the Chinese people not the foreigners most interested in the subject should know what is taking place. Whatever may have been the reasons, secret diplomacy is a damnable institution and should not be resorted to by nations which are constantly prating about the higher morality. It is apparent, however, from certain events that both the United States and Great Britain were prepared to send delegates to Nanking to meet on November 19 to discuss the gradual abolition of extraterritoriality. This meeting never took place. Instead, Dr. C. C. Wu, Chinese Minister to the United States met Mr. Nelson T. Johnson, the new American Minister to China in Washington and a leaded veil has been drawn over the proceedings. Nothing appears in the press ; no announcements are made by any Governments and no one knows what is taking place. Thus we approach January 1 with uncertainty and with a general confusion as to what the situation really is.

Meanwhile certain events have taken place in China which temporarily changed the scene. First of all, the Manchurian authorities entered upon a separate understanding with Soviet Russia, in accordance with an agreement signed at Nikolsk-Ussurisk whereby China accepted Soviet Russia's ultimatum of July 13 as modified in August, with regard to all provisions. China agreed to dismiss the Chinese President of the Chinese Eastern Railway, and Russia agreed to change the personnel of the Russian Manager and Assistant Manager, providing, however, that these two individuals were to be given other positions on the railroad if Russia saw fit to nominate them to such positions, etc. The humiliation of this separate peace cannot be glossed over by Nanking's eventual (and after many denials) assumption of responsibility for an action of which they were clearly not cognizant when it occurred. The entire Chinese Eastern Railway incident has not only outraged public opinion in China but has led foreigners to recognize the disorganization in the conduct of the foreign policy of the country.

It was during the course of this affair that the trial of the Soviet citizens took place in Harbin. This trial was watched closely by students of judicial problems in China. The question of evidence need not be considered here, but the judicial processes are important because they are involved in the general consideration of the problem of the abolition of extraterritoriality. The entire procedure was extraordinary even to the pronouncement of judgment not in the court but in the jail. It is this question of judicial procedure which is paramount, for if the procedure is right, the innocent person has a chance, but apparently in Harbin the prisoners had no opportunity of doing more than asserting their innocence ; their guilt was assumed and the burden of the proof was on them. They could not prove their innocence in the circumstances.

At the same time, in Shanghai, the public was agitated by the confiscation of the Shen Kung-pao estate, in which the estate of a man dead more than a decade and a half and which had, mostly, been distributed, was declared administratively confiscated because of alleged peculations during his tenure of office years before he died. Three Chinese Presidents of the Shanghai Provisional Court were forced to resign because they would not accept responsibility for a legal confiscation of this property without due process of law.

Dr. C. T. Wang, Minister of Foreign Affairs

Dr. C. C. Wu, China's Minister at Washington

Finally, in November and December civil war again blazed forth in north, central and southern China, so that, at one time, it became necessary to evacuate British and American women and children from Nanking. It will be remembered that in the Strawn Report attention is called to the menace of periodic wars in China. Although this fighting has abated, it is not yet ended and the question of the disbandment of troops has not yet been solved.

The question of the abolition of extraterritoriality divides itself into two general parts, first, the principles upon which there is agreement ; secondly, the practice with regard to which Chinese and foreigners disagree.

The principle is quite clear ; all Powers join with China is recognizing that the time has come when the abolition of extraterritoriality should be seriously considered and that a *modus operandi* should be worked out for bringing to an end a system which the Chinese find umbrageous and which foreigners find irksome.

(Continued on page 544).

Clifford and Clementi

Clifford of Malaya

The resignation of Sir Hugh Clifford as Governor of Singapore and High Commissioner of the Federated Malay States, removes from active service one of the outstanding personalities of the Far East. A colorful and brilliant career has been brought to an abrupt and tragic close by the serious illness of Lady Clifford. The law of the colony in the Straits Settlements does not allow the Governor taking leave more than once in any period of two years and as it was imperative that Sir Hugh should accompany Lady Clifford home, he had no alternative but to send in his resignation. We join with our British colleagues in expressing regret that his distinguished services were terminated before he celebrated the jubilee of his entrance into the public service. His loss to the Far East will be felt as deeply by Americans as by his own countrymen.

Sir Hugh Clifford's career is unique and almost unparallelled for romance, adventure and service. Fighting his way up from the bottom of the ladder in a series of hard-fought campaigns against rebellious Malay sultans, datos and their fanatical followers, the seventeen year old British subaltern won his spurs in a hard school. The British have had to whip into shape many peoples and tribes in order to establish their authority and respect for the law. They have always recognized courage wherever found and to Sir Hugh Clifford more than to anyone else, the world is indebted for a better appreciation of the high qualities of the Malay fighting man. In the same way that their blood-brothers in Mindanao and Sulu won the respect of the grizzled Indian fighters of the old American army, the Malayan Moros tried the patience, endurance and courage of the British colonial service.

Sir Hugh Clifford's stories of those by-gone days when the world was young and adventure called, stirs the imagination. But, they are "*Days that are Dead*," days of hazardous campaigns that will never return. The generation of Quixotic fighters and soldiers of fortune to which Sir Hugh belongs, passed through hardships and perils that will never again fall to the lot of British or American knight-errants. Buckwhacking through jungles and dank tropical forests, where the enemy chooses his own time and place to fight and never shows his face; storming Moro or Malayan kampongs in the Far East; fighting Indians on the plains of the Far West; filibustering in the Carribbean; fighting for liberty or humanity in Cuba, or revoluting in some other Latin American country, and other desperate outlets for the hot-blooded, restless spirits of a by-gone generation, are possible no longer. Sir Hugh is one of the last of a fast disappearing but picturesque and splendid type that modern civilization and scientific methods of warfare have discarded. To him, it was all in the day's work; part of the everyday routine of a service, to enter which, he rejected a military career.

Sir Hugh Clifford has served his King and country with distinction in every quarter of the globe; in the West Indies, in Africa, in Ceylon, Borneo and Sarawak and although his name stands preeminent among the most notable of Britain's colonial administrators, it will always be associated with that wild corner of Asia that British forethought, energy and initiative has transformed into the Rubber Empire of the World, the fairest and richest Crown Colony that Britain ever possessed.

It is to be hoped that Lady Clifford's health will respond to a change of climate and that Sir Hugh may return to his post and round out his fifty years of service in the land that he loves. If, however, this is not to be, then there should be before him many years of invaluable service in some highly placed advisory capacity at Home.

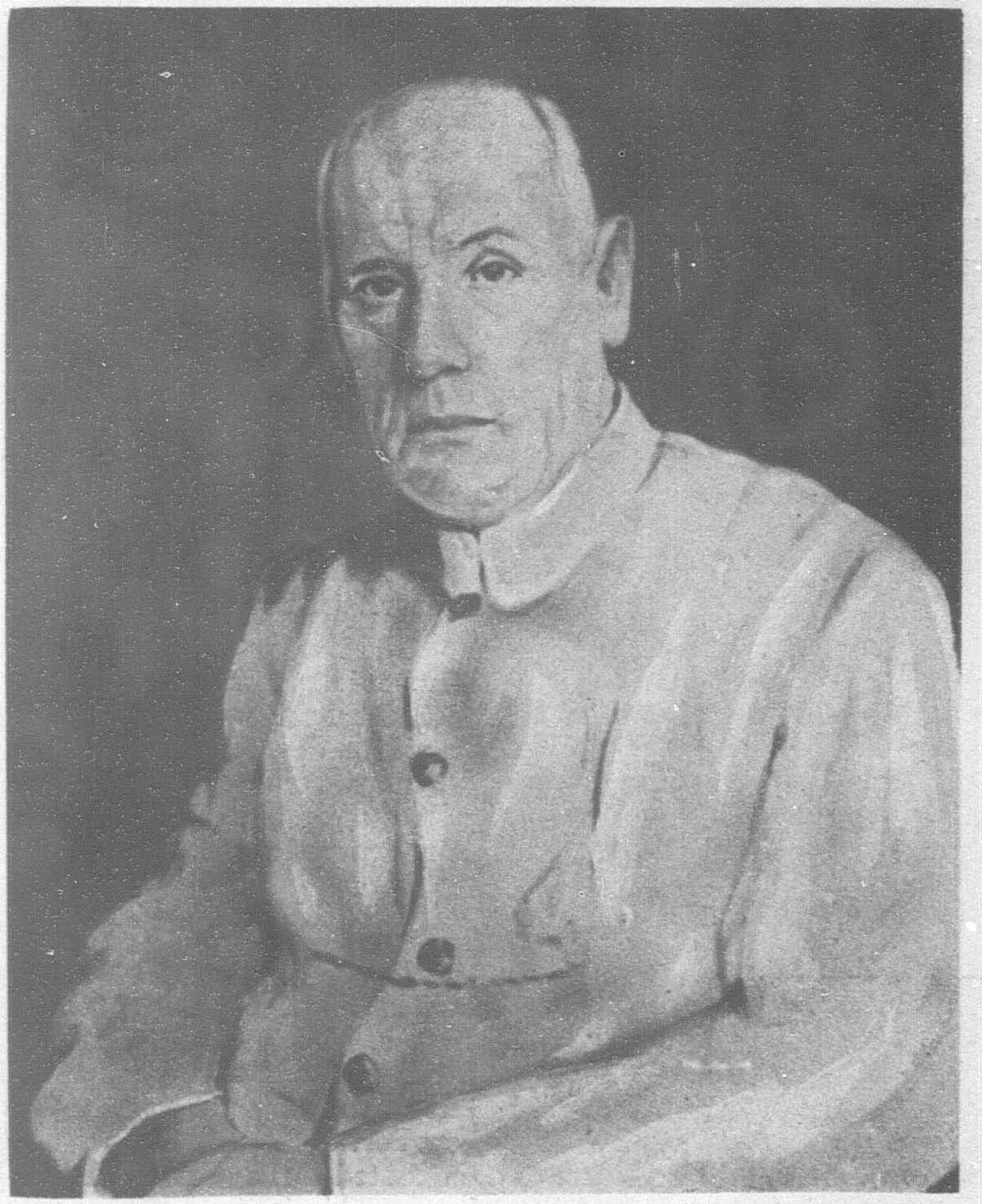


Photo from "The Straits Budget."

H.E. Sir HUGH CLIFFORD, M.C.S., G.C.M.G., G.B.E.

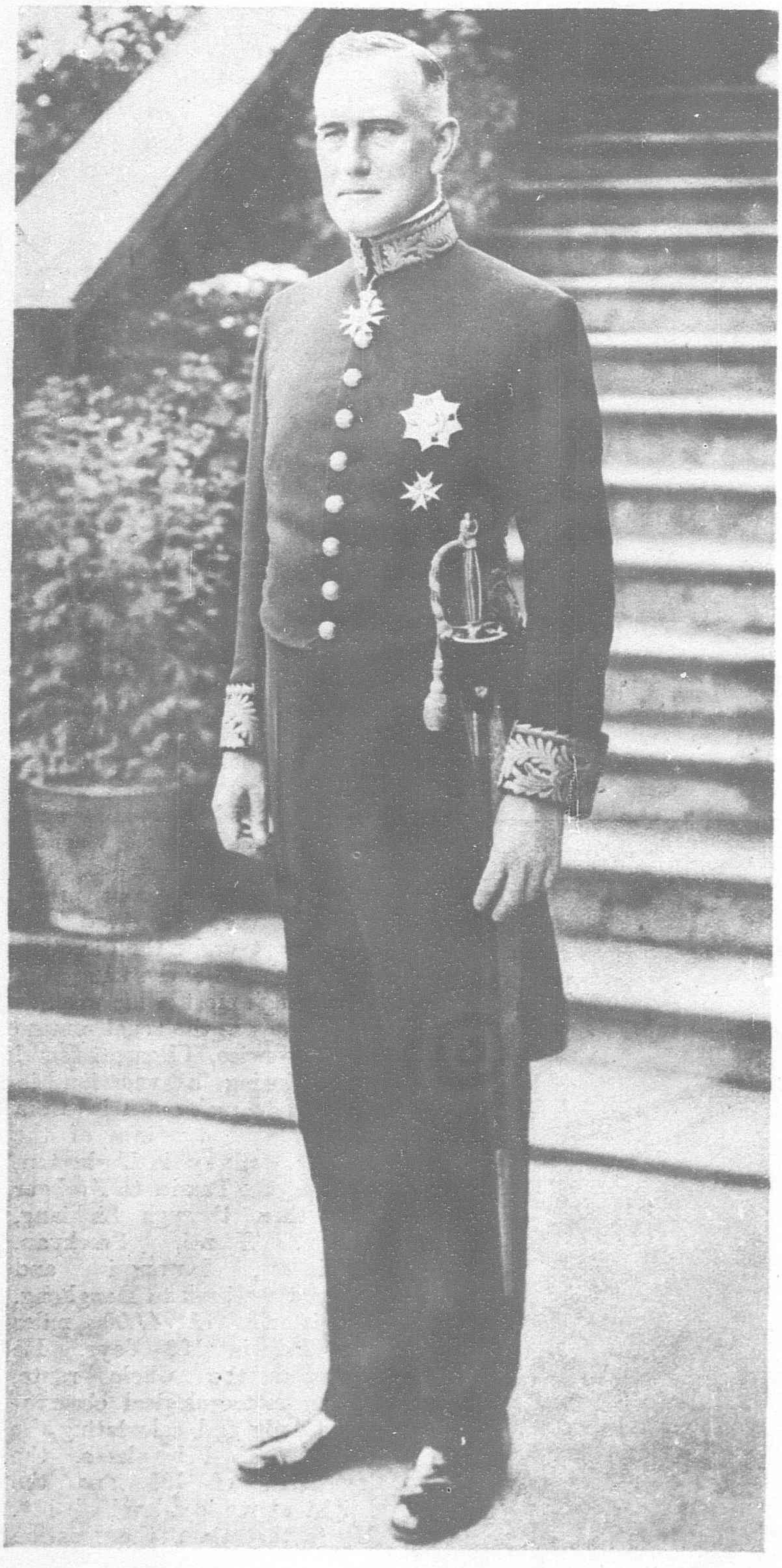
Sir Cecil Clementi

Sir Cecil Clementi, for the past four years Governor of Hongkong, has been promoted to succeed Sir Hugh Clifford as Governor and Commander-in-Chief of the Straits Settlements and High Commissioner of the Federated Malay States. Sir Cecil's record as chief administrator of Hongkong and British diplomatic agent during the most trying and difficult period the colony has passed through in its history, fully entitles him to this well merited recognition on the part of his government and earns for him the deep gratitude and regard of every British firm in China. Like his predecessor in office at Singapore, Sir Cecil is an expert on Far Eastern affairs, one of the highest authorities on British problems in China and as equally well informed on Chinese affairs.

Sir Cecil entered the Colonial Service in 1899, his first appointment as Cadet being to the Colonial Secretary's office at Hongkong. Here he remained until 1913, climbing up from the bottom to the post of Acting Colonial Secretary. His arrival in the colony followed shortly after the acquisition of the lease to the Kowloon territory, then an undeveloped waste land, harboring pirates, smugglers and other lawless elements. During these fourteen years, most of the important public works, railways, roads, water system, wharves and harbor extensions which have developed the colony into its present proud position, were conceived and carried out under the direction of the colonial authorities.

Although most of his work at that time was the usual routine of the service, Clementi found time during a vacation in 1907-08 to make a trip from Andijan, the terminus of the Russian railway in Turkestan, crossing the Pamirs to Kashgar and then through Sinkiang, Kansu, Shensi, Szechuan, Kweichow, Kwangsi and Kwangtung back to Hongkong, a distance of 4,000 miles travelled in 198 days. He surveyed the whole route, taking meteorological observations daily and calculating the latitude of 141 places, the longtitude of 139 and the height above sea-level of 185. Up to that time, the location of less than ten of these places had been definitely determined. Clementi's "Summary of Geographical Observations" compiled and published as the result of this lust for travel and adventure, placed China accurately on the map of the World. At least, it definitely located many places where they ought to be and still serves as the most reliable authority for the map makers of Western and Northwestern China.

Sir Cecil early mastered the Cantonese dialect and by 1906 passed his final examinations in Mandarin. It would seem that his knowledge of China's topography, the language of its people, their psychology and problems would have led his government to retaining him permanently in this country, transferring him from the Colonial to the Diplomatic Service where his talents and high ability would have helped to smooth over some of the errors which ultimately led to a disaster which might have been avoided. But the routine of the Colonial office took this expert on China away from Hongkong and buried him in British Guiana for nine years, where the only contact he had with the problems that interested him was the Chinese in that colony. This experience enabled him to write a most interesting book on "The Chinese in British Guiana." He was ordered to Ceylon as Colonial Secretary in 1922.



H.E. Sir Cecil Clementi, K.C.M.G.

It was not until after the May 30th affair and the Shaki incident at Canton, when the whole of China was ablaze and seething with hatred of everything British, that his Government, seeking for a man to pull it out of the mess, remembered Clementi and ordered him to Hongkong as Governor. Arriving in the colony on November 1, 1925 with the port paralyzed by a shipping strike and trade boycott, the job that could not be handled by the diplomats at Peking was shouldered on to the Colonial expert on Chinese affairs. The solution of Britain's trouble lay in placating the Cantonese, and here the new Governor was perhaps the one man in the British service that could deliver the goods. He knew Canton and the Cantonese. He could talk to them in their own tongue. In his younger days he even translated a volume of Cantonese Love Songs. He was the right man in the right place.

Unyielding in his defence of British rights and prestige but with a sympathetic appreciation of the Chinese viewpoint and grievances, he argued it out with the Nationalist leaders and saved the situation. Business and diplomatic relations were resumed on a new basis of friendly understanding and co-operation. British interests in China were placed on a firmer and more satisfactory footing. A grateful government promptly rewarded him. In the New Year Honors List of 1926 he was knighted and invested with the K.C.M.G. and decoration by Prince George in November of that year. It is to be regretted that once again the exigencies of the Colonial Service removes this capable diplomat-administrator from a sphere where his guiding hand is still urgently needed. The promotion, however has been well earned and again we join with our British friends in wishing Sir Cecil every success in his new post, where his past experience will be a great asset in helping to implant reforms in a community where Chinese commercial interests largely predominate.

Greater Shanghai

The Chinese Plan for a New Port at Shanghai

If the Chinese only had the ready funds to carry out all their plans, in a few years, the country would rival the United States in industrial importance. There are many ways to impair the present property values of the port of Shanghai and transfer the wealth to Chinese hands, and every so often, we hear of some new grandiose project that will divert the trade of the present port to some other location under exclusive Chinese jurisdiction. We are now informed that the Bureau of Harbor Affairs for Greater Shanghai has designed a plan to dig a new Whangpoo River and develop the harbor of Shanghai into one of the world's finest ports.

The scheme is in accordance with the principles laid down by the late Dr. Sun Yat-sen in "The International Development of China."

The Bureau of Harbor Affairs proposes that two years should be spent in making a survey of the new river bed and for the purchase of the land through which it will pass, and that another eight years should be devoted to digging the new river, to filling up the old Whangpoo, and to constructing dams, dockyards, etc. However, it is said, before the scheme can satisfactorily be put into effect, it will be necessary to remove the silt at the entrance to the Yangtze.

Should the scheme be realized, it is said, Shanghai will become one of the greatest harbors in the world.

Now, if it weren't for the Fairy Flats and a few other nice squishy mud banks at the mouth of the Yangtze, this would be a wonderful scheme. But "Old Man River," keeps rolling along, carrying with it the mud and silt of half of China and insists upon depositing it just at the very place where it is least needed. The creation of a new Port of Shanghai along the lines suggested, would probably be facilitated if the Yangtze River Improvements were first taken in hand. This, in itself will keep the Chinese guessing for many weary years.

The Kemmerer Commission in China

By GEORGE E. SOKOLSKY

The Commission of Financial Experts, as they were technically termed in the Ministry of Finance, or the Kemmerer Commission, as they were more familiarly dubbed by the press, spent ten months in China and has now been dissolved. The Commission has written its reports and most of the members have left China for the United States. A few have been retained for subsequent advisory service in China; one has accepted an administrative position in the Ministry of Finance and one has been retained in an advisory capacity by the Central Bank of China. The Commission's reports are both general and technical and lay the basis for the reorganization and administration of the finances of a stabilized China. The principal administrative function in China still have to do with finances, which, as long as militarism continues or even during the Period of Tutelage, is the real job in government.

It is difficult to appraise the work of Dr. E. W. Kemmerer and his associates because their task was one of the fundamentals. There could be nothing spectacular in diagnosing a disease and preparing a cure. Dr. Kemmerer and his associates gave no interviews to the press; they refrained from advertising themselves; they offered no bally-hoo of prophecies and nostrums. They did not partake of the personal relationships among ministers and politicians and avoided any activity of a political nature. They studied fiscal and administrative problems; they prepared their report and dissolved their commission. It is up to whatever Chinese Government exists to accept their report in whole or in part, to enact their recommendations into law, to organize the administrative agencies which will make effective their proposals. So far as can be learned, they sought not to premis their findings on immediate political phenomena and peculiar psychological elements which have to be regarded as abnormalities responsible for the present chaos and with which neither they nor the Chinese Government could afford to compromise. Their basis is the existing system reorganized and revised on a foundation of stable political conditions by a government capable of enforcing its writ throughout the country and prepared to support modern methods and institutions.

Photo by Jossepho

Dr. E. W. Kemmerer

The members of the Kemmerer Commission were no novices in this particular work. Dr. E. W. Kemmerer, its President, has since 1904, been an adviser to governments on fiscal questions. He drafted most of the legislation placing the Philippine Islands on a gold bases. From 1904 to 1906, he was chief of the division of currency of the Philippines. Since then he has been financial advisor to the following governments: Mexico, 1917; Guatemala, 1919; Colombia, 1923; Germany in connection with the Dawes Committee, 1924; Union of South Africa, 1924; Chile, 1925; Poland, 1926; Ecuador and Bolivia, 1926. China, 1929. Altogether Dr. Kemmerer has been, in one capacity or another, financial advisor to eleven countries. It would require a much longer and more technical article than is possible here. He has been professor in Cornell and Princeton Universities; he is the author of important studies on financial questions. There can be no question as to his suitability for presidency of the Commission of Financial Experts of China and his work, his conduct, his attitude have fully justified the choice.

Dr Arthur N. Young, the expert on public credit, has also had a wide and varied experience both in the United States and abroad. He was an adviser to the Mexican Government on taxation in 1918 and trade expert of the U. S. War Trade Board, during the same year. For some years until recently, he held the responsible position of economic adviser to the United States Department of State. He saw service with the American observer of the Reparations Commission in the preparation of the Dawes Plan. He is, in particular, an expert on public debts, and served during the inter-allied debt negotiations of the United States from 1924-27.

Dr. Oliver C. Lockhart, expert in taxation, is head of the Department of Economics at the University of Buffalo and has been Professor of Economics at Ohio State University and tax expert in taxation of the National Bank of Commerce in New York. He was tax expert of the Kemmerer Commission in Bolivia and Ecuador.

Mr. W. B. Poland is a railway engineer of prominence and has seen service in the construction work of some of America's principal railways. In 1920, Mr. Poland became General Manager and Chief Engineer of the Alaska Central Railway. From 1907 to 1915, Mr. Poland was Vice-President and Chief Engineer of the Philippine Railway Company. During the war, he was Director in Belgium of the Commission for Relief in Belgium and in 1917, became its Director for Europe. In 1919, he was the engineer member of the American Military Mission to Asia-Minor and Trans-Caucasus. Throughout the war period, he was closely associated with President Hoover's activities. He served as a member of the Milespaugh financial mission in Persia and for two years, served as Director General of Persian Railways.

Dr. B. B. Wallace, expert in tariff and tariff policies, has, since 1921, been chief of the division of preferential tariffs and commercial treaties of the United States Tariff Commission, of which he has been a special expert since 1918.

Dr. Frederick A. Cleveland has had a singularly important career in the general field of government research and is one of America's leading experts on Budgets and Budgetary problems. He has been employed by governments and important public organizations to devise suitable systems of accounting. From 1907 to 1917, he was Director of the Bureau of Municipal Research of New York and was charged with the reorganization of the accounting system of New York from 1907 to 1910, serving at various times in similar capacities for some twenty American cities and towns. He served as chairman of President Taft's

Commission on Economy and Efficiency from 1911 to 1913. From 1914 to 1915, he was engaged in preparing the report on the organization and administration of New York State for the Constitutional Convention.

Other members of the Kemmerer Commission are Mr. F. B. Lynch, assistant expert in banking, who had some 16 years banking experience in the Orient; Dr. John P Young, assistant expert in currency, who is head of the Department of Economics at Occidental College and has made special studies in currency and banking both in Europe and Central America; Mr. William Watson, assistant expert in accounting and fiscal control who had wide experience in the United States in this field; Mr. Richard W. Bonnevalle, assistant expert in accounting and fiscal control, who was associated with the American Relief Administration in Russia, the United States Department of Commerce and Milespaugh Mission to Persia; Mr. Edward F. Feeley, General Secretary to the Mission, who served many years as U. S. Commercial Attaché in Argentine and in Mexico and was General Secretary of the Kemmerer Financial Commission in Ecuador and Bolivia. Dr. Frank W. Fetter, Under Secretary, who has been associated with Dr. Kemmerer on missions to Guatemala, Chile, Poland, Ecuador and Bolivia. Mr. John M. Gibb, jr., assistant secretary, who is an authority on things Chinese, having a knowledge of the spoken and written language. In addition there were three other assistants, Mr. Harry B. Price, who was born in China and is expert in things Chinese; Mr. Whitmore Dawes formerly of the Guaranty Trust Company, New York and Mr. G. M. Thompson, formerly of Dillon, Read and Company, New York.

The expert character of the Commission is evident from the men who compose it. They settled down immediately upon their arrival in Shanghai in January, 1929, to the task of gathering data and collecting facts. Now, that was unmistakably one of the Mission's most difficult jobs. For, the present government has inherited several generations of administrative chaos. There is a great lack in China of exact data and scientifically compiled facts. No one in the whole of China knows, for instance, how much revenue the Chinese people are annually paying. The amount that reaches the Ministry of Finance is known, but even with regard to that item, details are often missing. The amount of money expended by the Government can only be known in totals—the details are lost with individual officials who receive their appropriations in bulk and report their expenditures in bulk. The entire fiscal system has, since time immemorial, been confused, chaotic and wasteful. Mr. T. V. Soong, since his administration of the Ministry of Finance, has been seeking to bring modern administrative methods to bear in the collection of revenue, but he has been unable to affect the expenditure of revenue, because of the constant recurrence of civil wars. The Kemmerer Commission, then, first became a fact-finding commission and it need be no secret that their time in China was too short indeed to complete that task. Nevertheless the scientific and expert methods of the members of this Mission made possible an analysis of the data which became available and finally to prepare plans for the fiscal rehabilitation of the country.

The premise of the Kemmerer report is the political stability of China. If there are no more civil wars in China, if the national government is in control of the territory of China, if the authority of the national government is unquestioned throughout the land, then a definitive plan can be utilized so thoroughly to modernize the systems of collection, control and expenditures of revenue that the credit of the country may readily become rehabilitated and financial assistance may be forthcoming.

Stabilization is the goal that all Chinese and all foreigners, who think and write about China, set as the immediate objective. Since the days of Tseng Kuo-fan and Li Hung-chang after the Taiping Rebellion, China has been seeking modernization and stabilization. From Yung Wing's establishment of the first modern iron works in Shanghai to the organization of the National Aviation Corporation, China has been attempting to adapt an ancient economic culture to the modern world of the industrial and national revolutions. Has China totally failed? If we dissect China into several geographic parts, we find areas, like the Southern Kiangsu, the Canton Delta and the province of Chekiang, where China has succeeded amazingly. On the other hand, is the vast northwest where China has failed miserably. Has not the time arrived when China is to be judged in zones rather than as an entire entity? Is it not possible to adopt the most modern administrative systems in certain zone, while in others ancient methods must, for a period, still obtain? These are reflections rather than conclusions—tentatively suggested by the presence and work of the Kemmerer Commission.

Mr. Soong's appreciation of the work of the Mission is evident from the retention of Dr. Cleveland as Accountant of the Salt Gabelle, which places in his hands the reorganization of the control and audit systems of that important source of revenue, and of Drs. Young, Wallace and Lockhart and Mr. Watson as expert advisers to the Ministry of Finance and of Mr. Lynch as adviser to the Central Bank.

Defreezing China's Credits

No matter from what angle the financial problem of China is considered, the credit of the nation cannot be re-established without first recognizing the necessity of defreezing China's credit, that is, without first making provision to repay the defaulted obligations which stand as a huge boulder in the path of financial rehabilitation. And foremost among these ugly defaulted obligations are the merchant debts in default: debts which have no political concomitants, which came into existence through the sale of goods by manufacturers and merchandizing firms to various departments of the Chinese government.

It is estimated that the Chinese Government owes between thirty and forty million gold dollars to foreign manufacturers of railway equipment for materials and rolling stock delivered and in use. When the new Government was established in Nanking many of these manufacturers and their local representatives were prepared to take a chance and several contracts were entered upon with the new Government, in spite of the fact that no definite effort was put forth to make payments on the defaulted accounts. Agents were sent to China to enter upon arrangements, often extremely favorable to China, to assist in the liquidation of this indebtedness, but thus far, nothing has materialized because of the constant recurrence of civil wars, which have to a greater degree than the Chinese themselves realize, demoralized foreign favorable opinion abroad and which have sapped the energies of China's administative officials so that they have not been able to meet the greater and more vital problems which have confronted them. To-day, China faces a blank wall so far as credit is concerned. Some of her officials have been to New York and London in the hope of re-opening credits, but everywhere the question that is uppermost in the minds of manufacturers and bankers is the same: What are you going to do about defaulted payments for goods delivered? And to that fundamental problem there has, as yet, been no reply.

American manufacturers, in particular, are prepared to establish long term credits if there is an indication of a will to pay. Even during the period of war-time deflation, American manufacturers established such credits for the disorganized and war-torn countries of Europe and in most instances their confidence has been fully justified by the business-like attitude of the financiers and public officials of those countries. One of the most notable instances follows:

In July 28, 1919, when the Republic of Poland was only a few months old and before its borders had been finally determined, Samuel M. Vauclain, then president, now chairman of the board of the Baldwin Locomotive Works, sold $6,965,000 worth of locomotives to the new and struggling republic on credit. Poland was in dire need of railroad equipment. The Baldwin works was in need of new business, since industry at that time was slowing down rapidly.

"They will pay us," declared Mr. Vauclain to his associates. Some of them made no secret of their disbelief that the bread thus cast on the waters would ever return.

Mr. Vauclain's judgment has been vindicated.

Mr. Vauclain's contract, which called for the delivery of locomotives of a heavy type at Danzig, was the first American agreement entered into by Poland and was the first on a credit basis to be concluded, both as to performance and as to payments of principal and interest. It was one of the first extensions of commercial credit of the post-war period. After making the 1919 contract with Poland, Mr. Vauclain extended credits to many other foreign countries in need of Baldwin engines. At the end of 1922 the

(Continued on page 542).

MEMORIES

"Manolo" Piedra—the Aide-de-Camp of Antonio Maceo

CUBA'S NEW MINISTER TO CHINA

By GEORGE BRONSON REA

The last two months has witnessed the passage of many conspicuous figures across the Far Eastern news screen. The Engineering and Power Congress at Tokyo and the Institute of Pacific Relations Conference at Kyoto, brought to this part of the world a group of statesmen, diplomats, scientists and other notables preeminent in their respective spheres of activity. Into this flash of Far Eastern politics steps another figure who comes to us unheralded and almost unknown outside his own country. Modest, unassuming, dignified and retiring, the new Cuban Minister to China, General Manuel Piedra, comes to China with the mission of strengthening the bonds of amity and trade between the Goliath of Asia and the Bantam Cock of the Caribbean Walk. To the millions of Chinese and to the foreigners in the Treaty Ports, he is merely another Latin-American diplomat whose government cuts no ice in determining the solution of pressing Far Eastern political problems. Yet the Pearl of the Antilles has sent to China as its representative, a man of perhaps far greater merit and worth than any of the celebrities to whom we have recently rendered homage. Cuba has sent us a veteran of her war for Independence; the most picturesque, the most lovable and dashing figure in a galaxy of heroes whose exploits had they been performed on the European or American stage, would send their names thundering down the pages of history amongst the foremost Paladins of Freedom.

General Manuel Piedra y Martel

The World War has blotted from the memory of all but the older generation, the story of Cuba's struggle for Liberty. Never before had such large armies been sent overseas. Over 250,000 troops sailed from Spain to crush the rebellion and save the remnant of her great American empire. At no time during the course of the war did the effective Cuban fighting forces number over 20,000. Ten to one were the odds they faced. Their problem was to avoid battles against heavy odds and prolong hostilities until Spain was ruined financially. There were many generals in the small Cuban army commanding the scattered skeleton divisions, brigades, and regiments which accounted for the majority of the patriot forces carrying out the Fabian tactics of General Gomez. The real fighting of the war simmered down to a prolonged battle between the few thousand heroes under the command of Antonio Maceo and the picked battalions of Weyler.

The best fighting men in Cuba surrounded Antonio Maceo. Absolutely fearless himself he had a supreme contempt for the "cientifico" or non-fighting portion of the army. Maceo was a born guerrilla leader, next to Toussaint l'Ouverture, the Liberator of Hayti, the greatest negro warrior the Western Continent has produced. He led his men and commanded their loyalty, affection and respect by his reckless contempt for death. Foremost in battle, he rode at the head of the machete charge or directed the advance of his infantry from the front rank in the firing line. The most dangerous yet most coveted position in the Cuban army was a place on Maceo's staff. To be his aide-de-camp was the highest honor attainable, equivalent to winning the Victoria Cross or the Medal of Honor. Eighty of the best fighting men in the Cuban forces joined Maceo's staff when the Liberating Army started its victorious march westward into Pinar del Rio. Only eight survived the campaign and they carried enough lead embedded in their anatomy to start a fair sized ammunition dump.

It fell to the lot of the writer to be a humble observer of this epic struggle for liberty, a mere cub war correspondent of a New York newspaper; doing his best to chronicle the tragic events of a page of history that is now devoid of interest except to the surviving participants. He followed the fortunes of the Cuban army under Gomez and Maceo for nearly two years, taking part as a spectator in all the important battles of the war. The very names of these battles and of the men who ungrudgingly gave their lives that Cuba might be free, are now forgotten even by the people for whom they made the supreme sacrifice. But for those who lived through it all and came out of its horrors unscathed, there remains the memories of grim days of hunger, of fierce and heroic fighting against overwhelming odds, where no quarter was given or expected; of deadly machete charges; of daylight ambuscades and midnight surprises; of the storming of forts, the burning and looting of fortified towns; of days immersed in swamps with alligators and boa-constrictors, crawling across trochas, penetrating the enemy's lines through wire entanglements; above all, the memories of comradeship, of self-denial and of sacrifice, the little and big things which bind men to each other for life.

I can see again that worn and wasted column under Antonio Maceo fighting its way day by day through the massed battalions of Spain in Habana and Matanzas. I live over again the months that tried men's souls in the mountains of Piner del Rio, where the same heroic band drove back time and time again the fierce onslaughts of Weyler's picked brigades in the Rubi Hills, at Cacarajicara and at San Claudio. And there wells up a deep feeling of gratitude for a comradeship that on several occasions saved the cub-correspondent from capture and certain death.

When, wounded and unhorsed, with armored trains pouring lead across a level field, it was Alberto Nodarse, Maceo's aide, who carried him to the rear and handed him over to the Cuban surgeon. When a Spanish volley killed his horse outside the breastworks of Quivican, and he was imprisoned under its weight, it was a little Cuban negro cavalryman, black as the ace of spades, a mere boy, who, under a hail of bullets and with the Spanish cavalry charging out of the gates of the town, jumped down from his horse, dragged the correspondent from under his dead mount and carried him to safety on the back of his saddle. In the grim days of hunger, Maceo and his staff shared their scanty food with the American correspondent and, when he was sick, worn out and down with fever after traversing the swamps of Majana, it was in a Cuban hospital hidden away in the impenetrable fastnesses of the Havana mountains, that he was restored to health.

It was a gallant band that followed Maceo. " Perico " Diaz, Juan and Vidal Ducasse, Miro, Nodarse, Piedra, Penalver, Carlos Gonzalez, Justiz, Sanvanell, Bacardi, Pancho Gomez, Ahumada, Gordon ; the Roll of Honor of the Cuban Army. Day after day for eight months the little army of Maceo stood off one Spanish column after another. Every day during February and March 1896, Maceo fought the picked regiments of Spain. In these two months the foremost generals on the Spanish army list essayed in turn or in combination to defeat or capture Maceo. They all had a whack at him. They pressed upon his rear guard, harassed his flanks and massed their columns at strategic points to intercept his line of march and force a decisive battle. At a place called Diana in the province of Matanzas, the long drawn out continuous battle came to a temporary end. Maceo was in a trap, surrounded by eight Spanish operating columns. The railways to the north and south were lined with armored trains loaded with reinforcements. The Spaniards looked forward on the morrow to his surrender and the collapse of the insurrection. But the Cuban leader brought his 5,000 veterans out of the very jaws of defeat. While the Spaniards slept and under cover of the heavy early morning Cuban mist, Maceo slipped quietly between the armored trains and made good his escape to the southern swamps, startling Weyler and his generals by emerging from it far to the westward, leaving a trail of blazing towns and sugar factories behind him and once more carrying the war into the Province of Pinar del Rio.

Here Weyler had the fighting Cuban bottled up. Across the narrowest part of the island, from Mariel to Majana, a distance of twenty one miles, Weyler stationed over 20,000 men and built a chain of forts and blockhouses to keep Maceo in Pinar del Rio. He then sent another 25,000 men into the province with orders to force a decisive battle ; to get Maceo dead of alive. Maceo accepted the challenge and fought the Spanish army to a standstill. Weyler's forces suffered reverse after reverse. Try as they might they could never dislodge Maceo from his camp in the Rubi Hills. Time after time, the Spanish columns were permitted to penetrate deep into the mountains, when the little Cuban army decimated them from ambush and drove them out with crushing losses.

What Weyler could not do by force of arms he accomplished by terrorism. He concentrated into the fortified towns all the people living in the country. He burned their houses, destroyed their crops, dug up the sweet potato vines, slaughtered or commandeered the cattle, cut down the fruit trees and transformed the fair province of Vuelta Abajo into a dreary waste. When there was no more food for the Cuban army in the hills, they stole out at night and stampeded the cattle from the corrals of the Spanish commissariat. They stormed fortified towns and blockhouses, and looted the provision, clothing and shoe stores. They fought the Spaniards with their own ammunition. When the supply of cartridges ran low, one of Maceo's aides would take a dozen men and ambush a Spanish brigade. After the firing was over, the Cubans would search the ground and pick up a few hundred, perhaps a thousand, sometimes a full case or even cases of cartridges, spilled from the well filled belts of the Spanish infantrymen or discarded by the pack train in its haste to get somewhere else.

No army, no matter how valiant, could hold out for ever against such odds. The only way out of the trap was through Weyler's dead line. Here 20,000 seasoned veterans blocked the passage. In a military sense, the Mariel-Majana Trocha was impregnable. Only four small parties of Cubans succeeded in crossing it. Three of these took the line of least danger through the Majana swamp, slushing and crawling through the mud and slime for three days and dashing across the heavily patrolled line under cover of darkness. One of these parties of eighteen men escorted back to the comparative safety of Habana province, the two American newspaper correspondents who accompanied Maceo into the trap.

Impossible to get reinforcements to him from the East, Maceo was abandoned to his fate. He was finally compelled reluctantly to leave his devoted band in Pinar del Rio and cross the trocha for the purpose of organizing a new army to attack the Spanish line from the rear. Maceo declined to take to the swamp, selecting instead the more comfortable but hundred times more dangerous way across the bay of Mariel. Accompanied by twelve of his staff and four servants he made the crossing in a row boat under cover of the night of December 4, 1896. With him, went his trusted aides, Piedra, Nodarse, Gordon, Gomez, and others. Four days later he encountered the Spainsh battalion of San Quentin at Punta Brava and met his death. The volley that ended the career of Antonio Maceo laid low his two aides, Piedra and Nodarse. The world rang for months with conflicting stories of Maceo's death. Even the American Congress passed resolutions denouncing Weyler for the alleged betrayal and assassination of Cuba's fighting chieftain. But Maceo fell in a fair fight, leading his men in a forlorn hope.

His surviving companions made their weary and dangerous way to report to their government in the eastern end of the Island. " Manolo " Piedra, eighteen times wounded, finally arrived in Camaguey and joined the forces of Calixto Garcia who succeeded Maceo as second in command of the Cuban army. In Camaguey and Santiago de Cuba he rounded out his brilliant career in the cause of liberty by taking part in the capture of Victoria de las Tunas and other stubbornly defended Spanish strongholds. Here he fought side by side with Fred Funston, with Janney, with Latrobe, (President Coolidge's military aide) and the group of hard-boiled two-fisted American soldiers of fortune whose gallant fighting and splendid handling of the Cuban artillery forced the Spaniards to surrender several of their most heavily fortified towns. When Funston was hurled through the air by the bursting of a Krupp shell and it looked as though he was cut in half, it was " Manolo " Piedra who dashed into the hail of Mauser bullets and shell fire and carried him to safety. And at San Juan Hill, when the American Army rang down the curtain on the tragedy of Cuba, Colonel Piedra was there on the staff of General Calixto Garcia, and for the last time offered his life for his country by taking part in the charge that broke the power of Spain in the Western Hemisphere.

A grateful republic conferred upon him the stars of a full general. His peace time government transformed him into an easy-chair diplomat and after twenty years service in Central America, sends him to China as Minister of the Republic of Cuba. Higher earthly honors may await him, but in the hearts of his countrymen his fame and laurels will rest with his brilliant record and heroic, dare-devil deeds in their long drawn out struggle for Independence. Commandante "Manolo" Piedra, Ayudante de Antonio Maceo, te saludo ! Bienvenida a China !

Defreezing China's Credits

(Continued from page 540)

corporation had $20,000,000 of such credit outstanding which total includes over $2,000,000 of locomotives supplied to the Chinese Government railways. Most of it has now been discharged, each payment met on the day it was due. The one nation that has abused this credit arrangement, is China.

In acknowledging receipt of the check for Poland's final payment of $995,000, last August, William de Krafft, treasurer of the Baldwin corporation, declared that without exception each payment of principal and interest had been made on or before the day of its maturity.

" We are aware," said Mr. de Krafft, " that there were many times during the ten years of the contract when payments were made under conditions of greatest difficulty to your government, notably one payment which was made to us on the day upon which the world waited with great anxiety to see whether Poland could successfully withstand the drive of the Bolsheviki."

"HARD APPLICATION"

From the Bottom to the Top

Baron Takuma Dan is Honored by the American Institute of Mining and Metallurgical Engineers Sketch of the Career of a Man Whose American Training and Influence has Contributed to Raising Japan to a Foremost Place in "World Commerce and Finance."

ONE of the outstanding figures in international finance and industry is the American trained engineer-genius who, for the past fifteen years, has directed the fortunes and activities of the Mitsui Family, until to-day it is the leading trading organization in Japan and perhaps in the world. His creative, executive and organizing ability has not only won for the name of Mitsui a distinguished and honorable place high amongst the world's industrialists, but has to a great extent influenced that complete revolution in commercial methods which has carried the nation itself through a period of deep suspicion and distrust and established a new code of commercial honor and ethics characteristic of the real spirit of Old Japan. It has taken years to break down prejudices and counteract the propaganda accusing the Japanese with unfair competition and other unethical practices in developing their commerce, but we now have a frank and honest admission from the highest British technical authorities that Japan has won and holds her commercial position as the result of close co-operation and intelligent organization amongst her foremost trading concerns. The only way that British textile interests can regain their old supremacy in certain markets, is to follow the precedent set by the competitor they have so roundly and loudly abused and denounced for a long period of years. As the Director General of the Mitsui Gomei Kaisha, Baron Takuma Dan, is entitled to much of the credit that must be generously extended by his Government and business colleagues for this indication of Japan's commercial honor and the perfection of an organization that leads the modern world in trading efficiency.

During the recent Engineering Congress held in Tokyo, the American Institute of Mining and Metallurgical Engineers, conferred on Baron Dan, the signal distinction of an Honorary Life Membership in the Institute, an honor rarely awarded and held by only 15 members out of a total of 9,000.

A parchment scroll setting forth the admiration of the members of the Institute was presented to Baron Dan by Mr. F. W. Bradley, president of the Institute, who presided at the dinner given in his honor. Professor Robert H. Richards, professor emeritus of mining engineering at the Massachusetts Institute of Technology, also an honorary life member, introduced Baron Dan at the dinner and sponsored the presentation. Baron Dan was a pupil of Professor Richards in the United States 50 years ago.

Baron Takuma Dan, Director-General of the Mitsui Gomei Kaisha

Viscount T. Inouye, formerly Minister of Railways and one of Japan's leading mining engineers in a speech delivered at the dinner gave the following outline of Baron Dan's career:

"Baron Dan was born in a samurai family at Fukuoka, Kyushu, on August 1, 1858. In 1871, when he was 13 years old he was singled out by his former Daimyo, Lord Kuroda, to accompany him to America for the prosecution of study. He travelled on the same steamer as Prince Iwakura and his suite, the first envoy to Europe and America sent by the Meiji Government, and proceeded to the United States. After preparing himself at Boston he entered the Massachusetts Institute of Technology, taking the course of mining engineering and took his B. Sc. at the institute in 1878.

He returned home from America in that year. In the following year he was appointed assistant professor of the newly established Osaka College, and afterwards transferred to the similar post at the Tokyo Imperial University, and retained the post until 1884 when he was appointed an officer in the Department of Public Works in the Imperial Government, thus engaging about five years in teaching.

"Soon after assuming his post he was ordered to take charge of the development work at the Government Colliery at Miike. It was decided to sink new pits at Kachidachi and the work was started. But the work did not make much progress, the heavy influx of water into the pit making the operation extraordinarily difficult. He was ordered in 1887 to proceed to America and Europe to make a thorough investigation of the working of heavily-watered pits and other matters. While he was staying abroad the Government sold the Miike Colliery to the Mitsui interests.

"Returning to Japan in 1888 he became the manager of the colliery under the new owners. While the sinking of shafts at Kachidachi was making little progress a severe earthquake was experienced in that district, and the sinking pumps operating in the pit were entirely submerged by a sudden influx of water and the pit sinking was temporarily abandoned. In the face of immense difficulties, however, Baron Dan obtained the consent of the Mitsuis to continue the working by installing a couple of Davy's differential pumps. The pumping plant proved a success, and the sinking of the pit was soon completed. Following the Kachidach other Miike pits were opened one by one. The similar pumping plant installed at Manda pit was the one described in 1911's edition of *Encyclopaedia Britannica* as 'probably the heaviest existing colliery pumping plant, which has a capacity of 40.3 tons per minute lifted 900 feet.' Inaugurating new methods of working as well as up-to-date machinery, he succeeded in the course of a few years in building up the Miike Colliery into a prosperous mine. He extended his activity to the neighboring coal districts, and afterwards did much for the development of the coal fields in the Hokkaido.

"It had long been his cherished ambition to develop the Japanese iron and steel industry. Since 1905, when he was appointed director of the Japan Steel Works, he has had the opportunity to realize his hopes. Taking part in the management and working of the Wanishi, Kamaishi and other iron works and iron mines, he has contributed considerably to the development of the industry.

"As a member of the Government Commission, he also did much toward the shaping of national policy in regard to iron and steel. As for other metals, Baron Dan's cherished plan to distil zinc ore, which had been exported abroad, was realized, and not only metallic zinc but zinc plates are being successfuly produced at the Miike Zinc Refinery. His service also was notable in the successful working of gold, silver, lead and sulphur mines under the management of the Mitsui Mining Company.

"After the Russo-Japanese War he extended the coking plant at the Miike Colliery, installing Kopper's regenerative coke ovens, together with a by-product recovering plant, which later developed into dyestuff and other chemicals works. He thus contributed much toward the success in manufacturing dye intermediates, dyestuff and other chemical products as well as chemical fertilizer.

"Another notable contribution by Baron Dan is the construction of the Miike harbor for shipping coal from the Mitsui Company's mine, as well as for the general trade. The harbor was completed in 1909. This is the only harbor in Japan with a lock gate tidal basin and a quaywall 1,380 feet long having 30 feet of water inside the dock capable of accommodating ships of 10,000 tons. The harbor is connected with the colliery railway and is provided with patent coal loaders designed by him, and storage management.

"In 1894 Baron Dan was promoted to the managing-director of the Mitsui Mining Company, and in 1914 was appointed director-general of Mitsui Gomei Kaisha, the headquarters of the combined Mitsui interests. In this important post he is supervising, besides the mining enterprise of the Mitsuis, the Mitsui Bank, which is one of the biggest Japanese commercial banks with branches in London, New York and other overseas centers, Mitsui & Co., the largest Japanese trading firm, with the ramifications of branches and agencies throughout the world, besides being a big shipbuilder and shipowner, the Mitsui Trust Company, the most influential of its kind, a life insurance company and a warehouse company as well as affairs of many subsidiary companies and works including paper mills, electro-chemical works, electro-engineering works, rayon factory, waterpower companies, and tea and rubber plantations.

"On the other hand, he has given his time and energies in order to forward the general interest of science as well as trade and industry. He gave support to the establishment of the Japanese Institute of Physical and Chemical Research, of which he is a trustee. He is vice-president of the Imperial Academy of Invention. He also played an important part in the formation of Japan Industrialists' Club, of which he has been president since the establishment. He is president of the Japan Economic Federation, of which he is one of the organizers as a Japanese section of the International Chamber of Commerce. He is a vice-president of the World Engineering Congress, which is now sitting in Tokyo.

"I have already referred to his services as a member of the Government Iron and Steel Commission. He also was appointed member of a number of Government Commissions regarding trade and finance, and has made a valuable contribution to the shaping of national policy.

"Baron Dan has travelled extensively. He went five times to Europe and America, and once to China. In 1922 he visited Europe and America as head of the Japanese Business Mission, and journeyed through many industrial and financial centers in Western countries. It is needless to say how large was his mission's contribution to the better understanding between nations and the development of the international economic relations.

"His meritorious services were recognized by the Government. He was granted a degree of Kogaku-hakushi in 1899. In 1915 he was conferred a Court rank, and was decorated in 1924, and last year was raised to the peerage. I should like to add that his Alma Mater in America, the Massachusetts Institute of Technology, on the occasion of his elevation to the peerage of Japan sent him formal greetings and congratulations by an unanimous resolution of the executive committee, appreciating his leadership and directive energies in the fields of mining, commerce and finance.

"As above outlined, Baron Dan is a successful man as engineer, industrialist and business man. With his considerable achievements and high reputation, I firmly believe, Baron Dan well deserves to be appointed by the Institute as an honorary member. Though the Baron's career of three-score and 10 seems comparatively uneventful; in reality it was not. Becoming a teacher against his will after his return from abroad, he had to wait rather long till he was able to apply his profession and realized his cherished hopes. After he entered the mining business he had to surmount immense difficulties, technical and otherwise, necessarily attendant on every pioneer work. In his early days at Miike, in particular, he had to struggle with adversity, which he overcame with his indomitable spirit. 'Adversity makes man wise,' goes the proverb. He really merits his name Takuma, which literally means Hard Application.

The Problem of Extraterritoriality

(Continued from page 536)

As regards practice, there is a vast difference of opinion. Certain Chinese feel that if extraterritoriality is, from the standpoint of political ethics, wrong, it should be abolished absolutely and by one fell swoop regardless of any facts which may be brought to bear to prove that such abolition would work as much harm to China as to the foreigners who benefit from the existence of extraterritoriality. Their argument is that what is wrong is wrong and therefore should not exist, which is perhaps excellent philosophy but very bad politics and economics. For the fact is that extraterritoriality has existed for some eighty years and that a system of living and of doing business has grown about it, which has led to a capital investment of billions of dollars. Nothing should be done to endanger that investment or to imperil the lives of those who have come to China under the old system until a new system has been devised which can afford the same protection to life and property which was obtainable under the old system. To this the Chinese reply categorically that they can provide such protection which foreigners generally insist is not so.

The general foreign opinion is that the abolition should take place in accordance with one or two processes or both, working simultaneously. One is in accordance with the Strawn Report, that abolition should be gradual and should take place step by step as the Chinese prove their ability in particular respects to protect life and property by judicial procedure. The other is that when the Chinese have proved such ability in particular regions or if extraterritoriality is no longer of any avail in particular regions either because foreigners have no interests or no presence there or because it is impractical to enforce consular jurisdiction there, then, by agreement, the system shall be declared as inoperative in those regions.

Either system provides an excellent method which the Chinese will sooner or later have to employ. As a matter of practical government, the second method is more advantageous to China than the first, for there are vast regions of China where extraterritoriality is utterly useless and where the foreigners have no interests. These regions might immediately be wiped off the extraterritorial map, so that China may have some specific gains at the present moment. Surely, no one wants to hamper the present national Government in maintaining itself and if such a diplomatic victory would assist it with its own people, an opportunity should be provided to win the victory. Secondly, the regions where extraterritoriality continues to be a necessity are so vast that the foreign powers have problems enough as it is and will benefit from a reduction in the territorial equation of the problem. Finally, the gradual abolition gives China an opportunity to set her house in order, to organize her courts and to provide workable laws, not in a jiffy but after due consideration, so that when the whole system goes, life and property will be judicially as safe in China as in any country in the world.

This is the situation as we approach the crucial day, January 1, when China will or will not take the momentous step of unilateral abolition.

Mr. Thomas H. U. Aldridge

A GREAT institution is almost always the embodiment of the ideals and accomplishments of a forceful personality. On March 30, 1901, the Shanghai Municipal Council engaged as an engineer Mr. Thomas H. U. Aldridge; twenty-eight years later the Electricity Department of the Shanghai Municipal Council, of which he was the Chief Engineer and Manager, was sold for Taels 81,000,000,* undoubtedly the highest price ever paid for a single unit in an electricity transaction. The engineers sent by the American and Foreign Power Company to Shanghai to examine the plant here and to determine its price frankly admitted that it was one of the best, one of the most modern and from the standpoint of the engineer, one of the best managed that they had ever seen. Their praise for Mr. Aldridge was so unstinted that the American and Foreign Power Company, always on the *qui vive* for competent men immediately engaged Mr. Aldridge first to continue in the management of the Shanghai plant and eventually to go to their London office as a permanent high official of the parent company.

Mr. Thomas H. U. Aldridge

To those who have lived in Shanghai and have seen the electric department grow and keep pace with the development of the city, the reward that has come to Mr. Aldridge is none too great. He deserves everything that can be said in his praise or done to call attention to his personality among the engineers of the world. In the management of the electricity department of the Shanghai Municipal Council, Mr. Aldridge was required to be not only an engineer and an excellent business man, but a diplomat as well. For his Board of Directors consisted of the ever-changing Shanghai Municipal Council; he had to avoid the pitfalls of favoritism and politics; he had to meet the criticism of interested parties. He had to provide a service which on the spot had to compare with French and Chinese competing companies in the French Concession, Chapei and Nantao. He had to convince cotton mill owners and flour mill owners and persons of all nationalities and diverse methods of work that they gained by utilizing his power and by availing themselves of the facilities afforded by his department rather than to put in plants of their own. He was faced with fearful strikes in the course of which his entire Chinese personnel walked out because of politicial intimidation; yet not for a single day was Shanghai without light. A capacity for organization, a knowledge of the local situation, a faith in the future of Shanghai—these guided Mr. Aldridge to his magnificent success.

After twenty-eight years of service, Mr. Aldridge produced an institution which not only supplied a satisfactory service to Shanghai, but which became the security for the bonded indebtedness of the city. It is estimated that the electiicty plant cost Shanghai approximately Taels 40,000,000; yet, the largest operating company in the world was prepared to pay twice that amount for the good-will and the potentialities of the institution Mr. Aldridge and his associates had created. It is again interesting to note the fact that whereas at the present time, it is so difficult if not almost impossible for the Chinese, even in territory adjacent to Shanghai, to obtain funds for electrical development outside their own country, the Electricity Department of the Shanghai Municipal Council was bid for by three world electrical organizations and was finally purchased at a price which exceeded by more than Taels 10,000,000 the irreducible set by the Council. What greater tribute can there be to the life-work of Mr. Aldridge than that?

The Shanghai Power Company, which now operates the former Electricity Department, will continue largely to be conducted by those who were most closely associated with Mr. Aldridge. Mr. C. S. Taylor, who became Deputy Engineer-in-chief and Manager and who joined the Electricity Department in 1913, has been appointed Vice-President and General Manager of the Shanghai Power Company and will be in effective control of the management and operations. The President of the Company will necessarily be an American, appointed by the American and Foreign Power Company, but the personnel will remain practically the same as selected originally by Mr. Aldridge, whose policy and practice Mr. Taylor undoubtedly helped to formulate and therefore can carry on unimpaired. In addition, as has been suggested, Mr. Aldridge will be associated with the parent company in London and will always be available for advice and assistance whenever the Shanghai company requires it.

The *Far Eastern Review* takes this opportunity to congratulate Mr. Aldridge on the successful termination of this one phase of his career and looks forward to great achievements by him in Europe and America where his opportunities will be even greater than they were here. At the same time, it is impossible not to congratulate the American and Foreign Power Company on the acquisition of a valuable man for their permanent staff whose knowledge, in particular, of Far Eastern affairs and conditions, will be invaluable to them in their efforts to expand in this part of the world.

---

* Approximately Gold $50,000,000.

Engineering Activities in China

A SURVEY

ALTHOUGH conditions throughout China in 1929 have been adverse generally to the development of industrial enterprises and new railway construction, the combined business of the local engineering firms has been of a very satisfactory nature, a marked increase over the business of the preceding year. For the first time in several years, the leading machinery and engineering concerns have covered expenses and in some cases made a substantial profit. In practically all lines of engineering, considerable business was consummated and given a more stable political condition and disbandment of superfluous troops, the coming year should witness a welcome revival of engineering activity. Continued civil strife during 1929 and consequent absence of protection for enterprises outside the Foreign Settlements; heavy and irregular taxation; lack of interior transportation facilities and shortage of funds for the rehabilitation of government enterprises, have all contributed to act as a brake on any general industial activity.

In some of the more important branches of the machinery trade in China, changes in purchasing conditions are being made which, ultimately will have an important bearing on the prosperity of local firms. A central Purchasing Commission for the Ministry of Railways has been established for the purpose of buying all the requirements of China's railways through public tenders handled through the Commission only. The object is by buying through one central organization to obtain open competition and consequent cheap prices and also to do away with the possibility of "squeeze" in placing orders with the officials of individual lines.

The intention on the part of the Government is undoubtedly good, but the proper machinery for operating successfully such a Commission has not yet been created. Tenders are being called for under all kinds of varying condition, many of which cannot be complied with by foreign firms. Cash deposits of various amounts are being required of each tenderer, and delay in decisions, changing of conditions after the tender has been made, together with other irritating requirments, has made this business so unattractive that in many cases only a few tenders have been sent in. A certain amount of business has been placed by the Commission, but only a very small amount of the necessary requirements of the railways has been filled this year. In a number of instances, the local railway managements are still calling for tenders, while in some cases such tenders after receipt, have been transferred to the Ministry of Railways only to be cancelled and new tenders called for. Much opposition has been offered by the local railway managements to this new system, with the consequence that where the Ministry has purchased materials for these lines, the management concerned has deliberately delayed accepting the goods on arrival in order to discredit the Ministry and the new system. It is however recognized that during the past year, the new Government has had all it could do to maintain itself in power, and that many of these incidents which appear to reflect upon the efficiency of the central Purchasing System, are only another phase of the struggle of the Central authorities to extend their control over the state railway system and liberate the lines from the grasp of the military. It is generally accepted by foreign engineering firms that, as conditions are stabilized, many of the incidents which now give rise to complaints, will be done away with.

In addition to centralizing the purchasing of railway materials, the government has created a Bureau of Construction, which is trying to control the electrical enterprises of the country. The declared policy of the Government is to obtain full control of all private electric light plants and operate them under a Central Government organization. Naturally, this invasion of the Government into the field of private enterprise has met with great opposition. Nevertheless, the official organization has already taken over a number of these private plants, agreeing to compensate the owners according to the value of the property, but so far no actual cash payments have been made, the Bureau attempting to issue ten and twenty year debentures secured on the properties, and then tp pay the owners with debentures. Although the influence of the Bureau does not as yet extend very far from Shanghai, its activities have alarmed the owners of all private plants throughout the country and for the time being has stopped improvements and extensions which otherwise would have been carried out. So far, the Bureau's ambitious plans for large scale extensions in the various cities have failed owing to lack of funds.

The Government has also taken a leading part in the development of aviation in China. "The China Airways" a joint undertaking between the Government and the American Curtiss-Wright financial group has been engaged in a transportation and air mail service, with a large number of planes imported from America and paid for by the American partners. The operation of the planes, also paid for by the American participants has been going on for some time between Shanghai and Nanking and Shanghai and Hankow.

All planes in use are of American make. Although this corporation is supposed to have the exclusive privilege of operating on certain specified lines, the Government, through the Ministry of Communications, has started an active competition on the very routes reserved for the Chinese-American corporation. For this service also, American planes are in use. All airplane purchases by the Government are supposed to be centralized in Nanking under the Aviation Bureau. Quite a large number of planes of various makes have been purchased throughout China during the year.

Mukden is reported to have about 140 planes available, mostly of French make. Canton and Hankow have quite a large number of planes of American, British, French and German make. Very few of the planes are being put to any practical use through lack of experienced aviators, and most of the planes are already in a deplorable condition.

While China is ideal for the development of aviation for mail and passenger purposes, until such time as the country has a sufficient number of trained pilots available, there is little hope of any extensive development, even though further planes, especially of the military type, may be purchased during the coming year.

Another development which has very great possibilities, is the sale of automobiles, especially trucks for use as buses in various parts of the country. During the year, road building has been going rapidly ahead in most parts of the country, and where buses are operating, it is a very paying enterprise.

The trouble has been, however, the lack of safety through confiscation of trucks by military officials. Consequently, the various enterprises formed for the purpose of operating bus services, are holding back until conditions become such that they can be reasonably sure of being allowed to operate the trucks they purchase. So far this development has been in the sale of the cheapest trucks, but on account of the very rough roads now being built all over the country, this trade will undoubtedly develop on the lines of the purchase of a better class of trucks than those which so far have held the field.

The greatest difficulty engineering firms in China have been up against during the past year, is the enormous amount of inquiries which they must answer, causing a lot of work and expense. The majority of these inquiries are not developing into orders on account of existing conditions. It is very difficult for an engineering firm to discriminate between inquiries likely to result in business and those made for the purpose of obtaining information. The employment by the Government of a large number of Chinese and some foreign engineers as advisors, etc., has resulted in a rush of inquiries imposing extra costs for engineering firms in China, to do business. This higher overhead is caused not only by the low rate of exchange but by the increased cost of living, higher duties and general advance in the prices of all living necessities of a foreigner in China. The salaries paid to engineers of various nationalities vary. The salaries paid to American and British expert engineers are very much higher than those paid to similar experts of European countries and these again are considerably higher than salaries paid to Japanese and Chinese engineers.

For an engineering firm to build up a large business in China, it is essential that efforts be made to employ Chinese engineers and experts to as great an extent as possible. The scarcity of good Chinese engineers, combined with the fact that the Nationalist Government has engaged a large number to work on its various projects, has made it necessary to raise salaries all around for this class of employee.

All of these factors combine to create a much higher cost of doing business for foreign engineering firms in China, than was the case a few years ago. The only offset against these adverse conditions is the fact that the engineering business is developing more and more on a technical basis to a point where ordinary import firms who used to dabble in engineering on a small commission basis, are finding it difficult to compete against speciality firms who employ experts in the various lines.

Dealing with the engineering business in the various parts of China, the following résumé is of interest:

MANCHURIA: A large amount of railway material ordered during 1928 has been delivered during the current year. Much difficulty has been experienced by the sellers to obtain payment in accordance with the contract terms. Continual changes in the management of the various Chinese owned railways, and lack of funds, have retarded placing of orders for locomotives and rolling stock, all of which is necessary for the equipment of the lines.

A certain amount of locomotives, cars and rails have been purchased, while a large number of tenders called some time ago for locomotives, cars, rails etc., are still undecided. The business consummated has mostly been for the cheaper materials, supplied largely from Europe. The South-Manchurian Railway has entered the field, selling cars built in their Shakako shops.

They have also disposed of a certain amount of old locomotives and rolling stock. A few Japanese built locomotives have been sold.

Prices quoted on American, British and first-class German locomotives have been more or less equal. Belgian manufacturers have quoted about 20 per cent. lower for locomotives, while another European maker has gone even below the Belgian prices. The Japanese makers in the few cases where they have tendered or secured orders, have met the Belgian prices. The South-Manchurian Railway has purchased a considerable amount of material during the year, but practically all orders have been placed with Japanese firms.

Practically all the big purchasing programme of the Chinese Eastern Railway, which was expected to materialize during the year, has been postponed due to the political situation. Should conditions improve and order be restored, the Railway will have to purchase a large quantity of locomotives, cars, rails, etc. etc.

The Hu-Hai Railway controlled from Kirin, has purchased various kinds of railway material, mostly from the Skoda Works and French manufacturers. This railway's purchases have also come to a stop for the time being, due to lack of funds.

The flour mill industry has been good during the year. A large number of mills of various sizes, mostly small, have been purchased. Practically all of this business has been secured by German and Swiss firms.

The Mudken Electric Light Works' new plant was finished during the year, and although the electrical development of Manchuria (outside the Japanese sphere) has been more or less at a standstill during the year, there are prospects of a further development in this line as soon as conditions become normal.

Oil mills have not done well. Practically no new business has been placed. General engineering business in Manchuria throughout has been poor, much below what can be expected when conditions in connection with the Chinese-Eastern Railway, etc., are again normal.

NORTH CHINA: Conditions which existed in 1928 have more or less continued during 1929. The difficulty of moving cargo on the railway, the numerous taxation stations located throughout North China, have made distribution of machinery in this part of the country practically impossible.

The silting up of the Hai-ho River, which has prevented steamers proceeding to the Tientsin Bund, has also had a very detrimental effect on the trade of the port. This condition, which could be remedied by action on the part of the Chinese Government, has been left to take care of itself, but through a fortunate action of nature the conditions have been improved to a certain extent during the end of the current year. Unless steps are taken to permanently improve the river, Tientsin will cease to be a maritime port.

The various coal mines in North China through lack of transportation facilities have either been compelled to suspend or operates on a very reduced scale.

The cotton mill industry in Tientsin has suffered throughout the year from the difficulty of obtaining cotton from the interior, and in distributing finished products. Although the mills have been operating practically continuously, prices obtained have been considerably lower in Tientsin than in Central China. This feature has been further aggravated by the fact that a number of the mills have had several bad financial years which forces them to sell their products immediately at prices which leave little or no profit. Besides the difficulty and the cost of transporting cotton to Tientsin, the various exorbitant taxes which are levied before it reaches Tientsin, and afterwards, have made the cost of cotton unnecessarily high. Various taxes on the finished yarn, demanded not only from the mills, but from the consumer as well, have made the retail price of yarn high enough, though the mills are not benefitting from these prices. There were certain signs of improvement in these conditions a few weeks ago, but the present political uncertainty is likely to prolong the above mentioned state of affairs.

Peking and district since the removal of the capital to Nanking, has become absolutely featureless as far as business in concerned. Even if business was available, the enormous increase in Octroi and other irregular taxes before goods can enter Peking, prevents any business of consequence being conducted there.

It is rather characteristic of the way these irregular taxes are levied to look back upon the origin of the Octroi tax. During the reign of the Empress Dowager a very modest tax was introduced, ostensibly to furnish the necessary funds to cover the use of perfumes and cosmetics used by the imperial court. It has since become a permanent feature, and during the last few years subject to continued increase and additions, being considered to-day as a legal and proper tax.

The Peking-Mukden Railway is gradually getting into better shape and has recently resumed purchasing materials necessary for its daily operating requirements. An order for ties and lumber amounting to $234,000 has recently been placed direct with the Wheeler Osgood Company of Tacoma.

The Peking-Suiyan Railway has been entirely in the hands of militarists, and the various taxes demanded by them have made transportation on this road practically impossible. After a vain attempt by the Ministry of Railways in Nanking, and the merchants in the North to induce the militarists to reduce the enormous taxes, the merchants declared a boycott a few months ago against the Railway, and practically no goods are now being transported by this line.

The Peking-Hankow Railway has most of the year been in the hands of the various militarists who have happened to control the country through which it runs. Practically none of its income has reached the proper authorities, and no purchases other than those absolutely essential to run the road have been made.

To rehabilitate this road, a large amount of money is required. It is in need of practically everything required by a railroad. The minimum estimate made by the Ministry of Railways' Foreign experts, is to the effect that at least $5,000,000 must be spent to supply only the absolutely necessary replacements of locomotives, rolling stock, rails, sleepers and repairs to bridges and permanent way.

A plan has been worked out, based on the idea that the road would issue $45,000,000 worth of bonds using $30,000,000 of these bonds to repay the old creditors on the condition that these creditors accept 50 per cent. in new bonds in payment of further material for the road. This plan has not yet been officially placed before the Material Creditors, and under present conditions it stands little chance of being accepted.

A certain amount of material has been ordered from Belgium to be paid for by part of the money realized by the Ministry of Railways through the sale in the beginning of the year of the Belgian Boxer Indemnity bonds. The other part of the money obtained through the sale of these bonds is being spent for material for the Lung Hai and the Tientsin-Pukow Railway. All of this business, however, has been placed without outside competition, with Belgian makers.

The Tientsin-Pukow Railway besides the above mentioned purchases which cover wagons, rails, etc., have purchased ten locomotives through the Ministry of Railways from the Baldwin Locomotive works, but daily purchases for their current requirements have been made direct by the Railway on a cash basis.

CENTRAL CHINA: The continuous immigration from Shantung to Manchuria has made any development of industrial enterprises in this province negligible.

The Tsingtao-Tsinan Railway has purchased a certain amount of supplies during the year, including rails and bridges, orders for most of which were secured by American manufacturers. This railway's orders, however, have been confined to actual requirements for operating the road. No increases in locomotives or rolling stock of any consequence has been made during the year.

The cotton mills in Tsingtao district have been subjected to strikes and lock-outs for the greater part of the year, and no further development of the industry has taken place.

A few orders for refrigerating machinery in connection with the egg export business, have been placed with American manufacturers. There seems no immediate prospect that this part of Central China will become a potential buyer of machinery.

The greatest development of industrial enterprises and the greatest sale of engineering material has, the same as last year, taken place in Shanghai and surrounding districts.

It is generally understood that the development plans of Nanking have been finished by the foreign exports engaged in this work, but beyond having drawn up the plans, no steps have been taken to carry them out. A number of improvements, however, have been taking place in Nanking, especially in connection with electrical supply. The Nanking City plant has been increased by the installation of a number of Diesel engines and a 750-kW installation. Two of the Diesel engines, as well as the 750-kW set, were supplied by British manufacturers, and one large Diesel engine by Swiss manufacturers.

A complete field hospital on modern lines has been installed, all buildings, etc., imported from Seattle. A great deal of road building has been accomplished including the main road to the Sun Yat Sen Memorial. In consequence there has been an increased use of automobiles and trucks. A certain number of modern buildings equipped with modern heating and sanitation have been erected.

The Kiushing Cotton Mill, located at Kiukiang, has operated all through the year, and has recently placed orders for 10,000 spindles with American manufacturers. The town of Nanchang has increased its central station with the purchase of a 750-kW complete plant of British manufacture.

The cotton mills in Hankow have been working all year, and one of the Chinese mills has placed an order for 10,000 additional spindles with American manufacturers. Further development of this industry is planned and will undoubtedly be put through next year, if conditions remain as favorable as during 1929.

The Hankow Waterworks and Electric Light Company is contemplating a large increase in its central station, but lack of funds has so far prevented this project going through. Beyond these improvements no specific new enterprises have been started in the Yangtze district, but the general machinery business has been satisfactory, and has been spread more or less equally over the various types of machinery and supplies needed for established industrial undertakings.

The cotton mills in Shanghai, Woosung, etc. have had an excellent year, and some very substantial orders for new machinery have been placed, the principal ones being orders for 50,000 spindles by the Wing On Company, and 30,000 spindles by T. K. Yung. General orders for supplies, additional machinery of various kinds in connection with cotton mills, have been placed throughout the year, and have been re-reasonably equally divided between American and British manufacturers.

The knitting mill industry has continued to show a satisfactory development, and a large number of new machines have been purchased, practically all from American manufacturers. The flour mill industry has been satisfactory, and there is every prospect of increased sales in this line of machinery during the coming year.

The building trade in Shanghai has been excellent, and a large number of new buildings are being constructed at the present time, with a further large number being planned for immediate construction. The continuously increasing cost of land, and the evidently insatiable demand for modern accommodation is responsible for the fact that all new buildings are large apartment houses.

The most important engineering transaction which has taken place during the year is the purchase by the American & Foreign Power Company and their British, Japanese and other associates, of the Shanghai Municipal Electricity undertaking.

The constant growth of the use of electricity in its many and various forms, has continued during the year and the Shanghai Power Company will concentrate its efforts to increase the use of electricity, and the sale of electrical devices. The programme of this company is, as far as can be ascertained, to purchase their requirements in Shanghai pursuing an absolute open purchase policy, considering only quality and price. This should give a great deal of business to the various machinery houses, which, in the past, has gone direct to home manufacturers through the Municipal Council's home agents.

The Chapei Electric Light Plant, the Nantao Light Plant and the Waterworks have placed large orders during the year for equipment of various kinds. The Chapei company's new power station half-way to Woosung is nearing completion and will give thiscompany an additional 25,000-kW for distribution. Both of these companies have done exceedingly well during the year, and their business is constantly growing.

The Shanghai Waterworks has placed several large orders for increasing their plant with British manufacturers. Large orders for machinery have also been placed by the Nantao Waterworks, partly with British and partly with American manufacturers. The French Electric Light works has installed during the year their recently purchased equipment, and it is understood that they will be in the market next year for further improvements.

Taken all through, the engineering machinery business in Shanghai and surrounding district, must be considered very satisfactory.

The shipbuilding business has also been satisfactory, not only as far as the foreign yards are concerned, but also the Chinese yards. A number of medium size vessels have been completed, and more ordered. Most of these companies, however, obtain supplies direct through their agents.

Considerable business has also been placed during the year by the Nationalist Government for radio equipment, telegraph equipment, etc., and further developments are planned in these lines.

The automobile business, including sale of trucks is on the upward grade, and the business during 1929 shows a very large improvement over 1928. A number of roads which have been built, and are being built in the vicinity of Shanghai, Nanking and Hangchow, should further improve this business. It is now possible to go by motor car from Hangchow to Nanking and it should be possible within the very near future, to go from Hangchow to Shanghai. By far the largest sales of cars and trucks go to American manufacturers, and the trade is mostly in cheap cars and trucks. The tendency is however that the demand for trucks will be for better qualities and as more cars are needed for outside roads and long travelling, a better quality will also be necessary.

SOUTH CHINA: Conditions in South China have been reasonably satisfactory. The usual political changes and consequent fall of Canton exchange has on several occasions during the current year slowed business up, but as a whole much development has taken place throughout Kwangtung province, as well as in Hongkong and the leased Territory.

The Peninsula Hotel has given a very substantial business to the various machinery importers. The Hongkong Electric Company has installed during the year a 10,000-kW increase in their plant, the machinery coming from British manufacturers. An order for two 5,000-kW sets for the China Light Company has just been placed, also the British Thomson-Houston Co.

A large order for cement machinery has been placed by the Green Island Cement works, with British manufacturers, and further orders in the electrical line in connection with this development will be placed shortly. The general machinery and engineering business in Hongkong has been well up to normal.

In Canton the Municipality has been responsible for a great deal of new public work, consisting of improvements to the Waterworks, building of roads, (involving purchase of road-making machinery) and various plans for further developments of this nature are under way, including the building of a modern Municipal hall. The Sun Yat Sen Memorial is nearing completion and has taken a large amount of fabricated steel imported from England and manufactured in Hongkong Dock Company.

An order for a 600ft. bridge from the Canton Bund to Honan was placed in November with American manufacturers. The cost of the bridge will be over Taels 1,000,000, and it is contemplated later to construct several more bridges of the same nature. The completion of the present bridge will take about two years.

The Canton-Hankow Railway have made a moderate amount of purchases, including locomotives, supplied by American manufacturers. Further supplies are needed by this Railway and given quiet conditions a good business might be expected during next year.

The Kwang-Tung Electric Supply Company has suffered severely during the year by the arbitrary action of the Municipal Government in cutting their rates down to a point where the company ceases to be a paying enterprise. A further detriment to the company's operations has been the fact that a large amount of their current is not paid for, partly through being used by officials who refuse to pay, and partly through being stolen by the general public, against which the company has no remedy. Given proper protection and proper rates, this company ought to be a very fine enterprise and capable of quite a large increased development. During the year it has placed orders for additional machinery in the shape of a 1,500-HP Diesel pant, which was secured by the Siemens-China Company.

A considerable amount of road building has been done in Kweichow and Kwangsi Provinces, and other parts of South China, and in consequence the demand for motor trucks has increased. No large orders, however, have been placed during the year on account of lack of funds.

There is every reason to assume that, given quiet conditions, a very satisfactory engineering and machinery business should be available in South China during the coming year.

Engineering Society Report

Supplementing the above general survey of engineering activities in China for the year 1929, Mr. Hans Berents, the new President of the Engineering Society of China, in his inaugural address, reviewed in detail developments in the International Settlement for the current year, confining himself largely to the municipal enterprises and public utilities. He drew attention to the fact that there has been a considerable increase in both land and water borne traffic during the year. This increase may be regarded as a normal development in a growing seaport and necessitates continuously increasing facilities on both land and water, and is undoubtedly also a sign of improved conditions and of increased confidence.

"It is here interesting to observe that although the route mileage of the Shanghai Electric Construction Co., Ltd., was the same for 1928 and 1929, for tramways and trolley buses, the increase in passengers carried for the first nine months advanced from about 89½ million to about 101½ million, which must be termed very high for a total route mileage of about 35 miles.

"In the French Concession the increase of passengers carried by the French Tramway Company advanced for nine months from about 44 million in 1928 to about 47¼ million in 1929.

"I understand that there has also been a considerable increase of passengers carried by the Chinese Tramways, the figures of which will be available at the end of the year.

"Shanghai being essentially a seaport, cargo landing arrangements force themselves on us for solution. It is evident that the congestion on the Bund foreshore is capable of little further intensity and the question of alternative accommodation arises. Should this be provided by harbor authorities or by private enterprise? Much of the cargo handled is destined for the interior. Dock frontage on this side of the river is limited and space must be reserved for ocean-going vessels. Smaller wet docks for lighter and sampan work with railway communication appear to be the reasonable and inevitable solution with increased godown accommodation adjacent to both rail and water, and this solution can be carried out without great difficulties.

"The noticeable change in building layouts and the movement of the suburban residential areas further from the town are having a marked effect. The erection of large office buildings and apartment houses and the building of blocks of smaller houses, on what were large private gardens, is going on apace and is producing a serious increase in population density, which in turn necessitates ever more and more traffic facilities. Such continued concentration may in time nullify the present expensive but necessary road widenings if bigger and higher buildings continue to be constructed on the newly widened roads. It is obvious that if the ratio of population to road width increases, or even remains unchanged, traffic congestion will not be adequately relieved.

"Looking well to the future several ideas suggest themselves. One would be a system of elevated railways, while another may be buildings of uniform height interconnected at roof level to form paths for pedestrians, shops, etc. Some solution may become imperative if the present artificial and cramping limitation of the port persists, but it is hoped that wise expansion to the limit of financial capacity under adequate town planning powers, composed of members from the various Municipalities concerned, will eventually overcome all difficulties, of political and other natures, and result in the rational growth of China's leading seaport, whereby first and foremost the Chinese nation would benefit enormously.

"Shanghai depends on the Whangpoo Conservancy Board to maintain the desired depth of water of the approaches to the port, and this work is being done efficiently, and quietly by the staff under the able leadership of our last year's President, Dr. H. Chatley.

"New construction has not been very brisk during this period. The ships built include several gunboats for the Chinese navy, three or four vessels for the Upper Yangtze for various owners, two of which are fitted with diesel engines, one diesel engined cargo vessel for the Middle Yangtze, two Middle Yangtze passenger vessels, one of which was finished earlier in the year, and the other completing. Also two large pontoon hulks to be used on the river Yangtze, besides various smaller crafts and lighters.

"With regard to ship repair, there has been great activity in this respect during the first six months of the year, particularly in the early summer when several large ships suffered damage through collision in the vicinity of the port. During the last two or three months the number of ships requiring repair has not been so great. Owing to the recent disturbances in the upper reaches of the Yangtze and owing generally to the unsettled conditions, owners of running vessels are averse to placing new tonnage, but at the same time inquiries for new constructions are fairly numerous.

Shanghai Gas Company

"This company has the distinction of being the only Utility Company of its kind in Smaller and Greater Shanghai, and do not therefore experience all the complex difficulties of the other companies.

"Shanghai was first supplied with gas in 1865. At the end of that year the number of consumers totalled 58, the length of gas main was 4.8 miles and the price of gas $4.50 per 1,000 cubic feet.

"The company's works is situated around the Thibet Road and Soochow creek junction and at the end of 1928 the site area was 40.99 mow. On this small site nearly $23,000,000 cubic feet of gas was produced and purified during 1928: the coal carbonized amounting to over 39,800 tons. The majority of coal used is Japanese and the coal storage capacity is 6,000 tons. The gas storage capacity is about 2,800,000 cubic feet.

"Some 130 tons of sulphate of ammonia is manufactured per year from residual ammoniacal liquor: 500,000 gallons of coal tar is recovered, the majority of which is worked up into dessicated tar, pitch and creosoted; and 17,000 tons of coke is sold to Shanghai contractors.

"Gas is distributed from the works through 3-14 inch, 1-12 inch and 1-18 inch dia. mains at an initial pressure of about 4½ inches W. G. and the supply to the outskirts of the district is boosted up by a high pressure system working at an initial pressure of 12 lbs. per sq. inch and being governed down to a final pressure of 3 inches W.G. The total length of gas main in Shanghai at the end of 1928 was 155.86 miles.

"The Chinese are rapidly becoming favorably impressed by gas for household use and the department manufacturing a special type of Chinese cooking stove has grown tremendously during the past year. At the present time we have over 1,000 of these Chinese stoves on the district.

"The growth of the gas cooking and water heating business has made it essential for the company to have larger and modern repair and assembling workshops and a three storied building 60 ft. by 150 ft. has just been erected to cope with this work. The building is arranged with central heating, electric lift, and other modern requisites; new high speed drills planing and shaping machines, and a 22″ lathe have been installed to cope with repairs to the ever increasing works mechanical plant.

"Owing to the great increases in gas consumption during recent years the Company's carbonizing plant is now working at almost its full capacity to cope with the winter load, and extensive installations of modern carbonizing plant and caol handling plant are anticipated in the near future.

Waterworks

"The growth of this undertaking is indicative of Shanghai's progress. During the last ten years the total annual consumption of this Company has more than doubled and on two occasions during the present year the quantity pumped has actually exceeded 50 million gallons in one day. The company, in addition to having supplied the demand at any moment, winter or summer, has succeeded, in spite of the ever increasing pollution of the source of supply, in maintaining a quality which bears comparison with that of any other city in the world.

"Since 1924 the company's settling tanks have been worked continuously instead of intermittently as in the past, slow sand filters have been replaced by rapid filters working at fifty times their speed, and the most modern chlorinating plant has been installed.

"During the last two or three years the company's pumping plant has been completely modernized, water tube boilers replacing Lancashire, triple expansion vertical engine replacing horizontal compound, diesel engines replacing steam. At the present moment the company has on order two main pumping units each of 15 million gallons per day capacity, one of these sets being driven by a 540 h.p. two cycle diesel, and the second by a 650 h.p. auto-synchronous motor.

French Waterworks Co.

"The number of consumers increased for the first nine months by about 10 per cent. as compared with the same period in 1928, but the maximum daily production was increased from about nine million gallons to about 12 million gallons, which is an increase of about 33 per cent. This fact is easily explained by the fact that one consumer may represent a block of one hundred houses or more. Sand filters and rapid filters are both used by the French Waterworks.

"On May 25 of this year, members of our society had the pleasure of visiting the New Works of the Chapei Electricity and Waterworks Co., and we then learned that this station will have a daily capacity of about 10 million gallons of filtered water, with provision for extension. Rapid filters are being used in this modern plant. The Nantao waterworks are being improved and good results are already noticeable.

Deep Wells

"The number of deep wells bored in Shanghai is difficult to ascertain, but must be considerable, because only one concern The China Well Drilling Corporation have drilled 13 wells ranging in size from four to eight inches in diameter since January last, and the capacity of these wells are over 4½ million gallons per day. The depths of the wells drilled in Shanghai vary from 350 to 960 ft. and the diameters range from four to 12 inches with capacities from about 70 to about 1,000 gallons per minute. The above mentioned company are now boring a 12 inch well for the Shanghai Waterworks Company, at their Kiaochow road sub-station.

Shanghai Power Company

"The demands for electricity in Shanghai continue to increase, and to meet this growth the Shanghai Power Company (formerly Shanghai Municipal Electricity Department) has recently put into commission an additional 40,000-kW. of generating plant at the Riverside power station, this section being known as "Riverside 'B'" in contradistinction to the other section known as "A."

"In section "A" there is installed 161,000-kW. of generating plant, and the steam pressure at the boilers is 200-lbs. per square inch, and the final steam temperature approximately 580 degrees-Fah. In Riverside "B" the steam pressure of the boilers is 375-lbs. per square inch, and the final steam temperature 700 degrees.

"There are four boilers installed—two manufactured by Messrs. Babcock & Wilcox and two by the Stirling Boiler Company. Each boiler has a normal evaporation of 145,000-lbs. of water per hour which can be increased up to 180,000-lbs. per hour continuous rating.

"In the turbine room two 20,000-kW. Metropolitan-Vickers turbo-generators have been installed and these machines each run at 3,000 revolutions per minute. The turbine of No. 14 machine, which was the first to be installed, is arranged for bleeding steam at two stages in conjunction with feed water heaters. The second machine has been constructed for bleeding at three stages, and uses three heaters.

"In addition to the extension at Riverside a new primary sub-station has been put into commission, which is designed for transforming and redistributing a maximum of 30,000-kW.

"As indicating the increased business of the power company it may be noted that whereas the total kilowatt hours sold last year were 458,360,215, it is estimated that during the current year 537,000,000 will be sold, or an increase of 17.15 per cent.

"The installed capacity of this company was increased by 3,500-kW. during the first nine months of 1929, from 10,500 to 14,000-kW. The kilowatt hours generated in the same period increased from 18.6 million to 22.9 million, which is an increase of over 20 per cent.

"There are six Diesel Engines installed, all of which are constructed and installed by the well known Swiss firm Sulzer, Winterthur. Two alternators of 1,000-kW. each, and two of 3,500-kW. each are of Oerlikon manufacture while two alternators of 2,500-kW. each are built by the firm of Schneider.

"In concluding I cannot but mention two large buildings completed and under completion here in Shanghai. They are the massive Sassoon Building on the Bund, and the imposing Cathay Mansions, opposite the French Club. Of these two buildings the most interesting is, I believe, the Cathay Mansions.

"The architects for both these buildings are Messrs. Palmer and Turner, and the Structural Engineer in charge, Cathay Mansions, H. Wakelam, Esq., of Messrs. Arnhold & Co., Ltd.

"The Cathay Mansions measures 14 stories high, and is probably the highest building of this type outside of North America. This building has been built in two halves at different times. The Western half had been built up some eleven stories, and settled four inches, when the Eastern half was commenced. From this time onwards the two halves settled practically at the same rate, leaving the difference in level between the two sections constant. Plaster put over the joints eight months ago, when the brickwork of the eastern half was commenced, has shown no sign of cracking.

"The difference in level of the two halves has been entirely hidden by grading corridors. The reinforced concrete rafts on "Franki" piles are practically identical for the two half sections of the building, as well as the steel frames and topmost reinforced concrete story, which was added as an afterthought. The heating is by hot water provided by steel steam boilers and calorifiers. The electric wiring is laid in galvanized conduits, and all piping is contained in eleven (11) vertical ducts running from the foundations to roof. The roof had been preserved flat for use as a roof garden, but when one sees such a tall building and considers the probability that mooring masts for airships will have to be established at all important centers, one wonders whether the roof of such a building, rising high above the surrounding structures, will not be suitable for such a purpose when properly equipped."

New Waterworks Plant for Canton

MODERN methods of towns water purification, including sterilization, are now in use all over the world, of which a good illustration is a contract that has been signed by Dr. Wu Pak-liang, commissioner for the Canton Municipal Waterworks and the Mayor of Canton, Mr. Lam Wan-koi, with the Jardine Engineering Corporation Ltd., of Hongkong. This is for the installation of a "Paterson" Patent rapid filtration plant at Canton to deal with 10,000,000 gallons of water per 24 hours on the latest scientific principles of sterilization and continuous treatment.

The raw water will be taken from the Canton River at Tsang Poo, about six miles from the City of Canton, and pumped to the "Paterson" patent rapid sand filters, the installation in this connection consisting of three electrically driven low-lift pumps, each with a capacity of 5,000,000 gallons of water per 24 hours, one being a stand-by. There will be a battery of 16 of these sand filters, operated in conjunction with the "Chloronome" apparatus for the complete sterilization of the water by means of a measured trace of chlorine gas, and the whole installation is on the same general lines for example as the Shing Mun Valley Scheme for the Hongkong Corporation. There is also included, for example, coagulent treatment by means of alumina with four very large sedimentation tanks having a total capacity of 1,200,000 gallons, allowing three hours' settling before passing to the sand filters. The total cost of the whole equipment, including the pumps, pipes, and other accessories, is we understand, approximately 2½ lakhs of Hongkong dollars.

This scheme was originally proposed by Mr. R. Chan Johnson the late Managing Director of the Canton Water Supply Co.. Ltd., which was subsequently taken over by the Municipality of Canton, in which connection the Commissioner, Dr. Wu Pak-liang and his associates made a complete inspection of the "Paterson" plants both at the Shing Mun Valley and the Bowen Road Scheme, Hongkong. When the installation is completed the important city of Canton will have a water supply equal in efficiency to that of the largest cities in Europe and the United States, while it may be mentioned that Canton is making progress in many other directions, including for example the introduction of a complete automatic telephone system.

The general method adopted in these schemes, of which a large number are at work in different countries of the world, with suitable variations according to the local circumstances, is to treat the raw water with lime and alumina coagulents, pass to settling tanks, and then to filter through rapid gravity sand filters constructed of ferro-concrete and filled with grated sand, through which the water circulates generally at the rate of 80 gallons per square foot of filtering surface per hour, being collected at the bottom by the "Chloronome" apparatus, which as a rule adds continuously about one part of chlorine gas to 2,000,000 gallons of water although the exact amount is varied, giving complete taste or smell.

Direct Purchasing of Materials by Chinese Railways

FOREWORD: Each year, despite civil warfare and governmental chaos, the trade of China registers a marked increase. On the other hand, old-established foreign firms who laid the foundation of this trade and built it up to its present splendid proportions, are not profiting by this steady expansion. In fact, many have been forced out of business, some are deeply in debt while others are being carried by the banks. It is true that a number of these business disasters are directly traceable to the failure of successive Chinese Governments to pay their debts, but even this cannot be stretched to explain the general downward trend in the fortunes of foreign commercial concerns. There is only one explanation for this phenomena. The Chinese purchaser, financed by his own banks, is more and more entering into direct relationship with the foreign manufacturer, eliminating the foreign middleman in China and the old compradore system. The concentration of the wealth of China in the Treaty Ports has swollen the deposits and assets of the Chinese banks, many of whom have established relations with the most powerful financial institutions in America and Europe. Their guarantee for the payment of the ordinary commercial bill of goods is as sound and acceptable as that of many foreign banks operating in China. It is only natural, that the foreign banks, in order to compete and hold their business, must, wherever possible, extend credits direct to responsible Chinese buyers and guarantee their payments for direct purchases.

THE announcement that Mr. J. K. Choy, Chief of the Administration Department of the Nationalist Ministry of Railways has been instructed to open a Purchasing Agency in London, is indicative of a new policy inugurated by Minister Sun Fo to cut down expenses by eliminating the middleman in China. and purchasing direct from the manufacturers. As Mr. Choy is in London on a mission connected with the use of the British Boxer Indemnity Funds for new railway construction, this step is undoubtedly intended to constitute a guarantee to the British authorities that the utmost economy will be practiced in the expenditure of any funds released for that purpose. It is a further assurance that full and free competition will be offered to British manufacturers of railway rolling stock and accessories and, everything being equal, tenders will be awarded to the lowest bidder.

The step taken by Minister Sun Fo follows a similar decision arrived at by the Mukden authorities, who some months ago officially advised interested parties that it would inaugurate a system of direct purchasing from railway equipment manufacturers in the United States. The new régime in Mukden feels that in the past, quotations have been made by local agents which necessarily included bonuses-(polite term for "squeeze") to railway officials directly concerned with the purchasing of equipment. They pointed out that an earnest effort is being made at this time to eliminate these confidential emoluments and consequently desire for the time being to deal direct with American manufacturers.

Mukden's program is, that all purchases will be made against irrevocable letters of credit and the shipments made c.i.f. Dairen; the Chinese railway authorities taking charge of the shipment at the port of entry and satisfying the existing regulations and procedure necessary for importing the equipment. The Mukden authorities state, in effect, that in the past their purchasing field has been circumscribed and limited to a choice of those comparatively few American railway material manufacturers having agents in China, and that this system, has deprived them of that free scope of competition essential to economy. The attitude of the Mukden authorities is important, inasmuch as their purchasing covers nine Chinese operated railways; lines now in their infancy and capable of great extension and expansion. This new policy of the Chinese Railway authorities in Nanking and Mukden affecting as it does the business of every engineering firm in China, although now in its initial and formative stage, is a contingency that must be reckoned with. The tendency of both governments towards concentrating all purchases under one agency and financing their own orders whenever possible is traceable to a desire to seek a wider competition than now seems possible by restricting their purchases through the manufacturers actually represented in China. Although the placing of such orders direct with the manufacturer through an official purchasing office located in London or New York, will operate to the disadvantage of local engineering firms, it can be seen how it will prove of inestimable value to the Chinese Government, when the time arrives to solicit foreign financial assistance in the construction and equipment of a new system of state railways.

In the past, China has paid to the banks issuing her railway loans, a flat five per cent. purchasing commission on all material purchased abroad. This additional perquisite to the bankers was equivalent to an extra 2½ per cent. on the entire loan, a very handsome payment for services which could be performed for about one half of one per cent. Without going into the details and history of how this five per cent. purchasing commission originated, it is sufficient to point out that the Chinese themselves created the precedent on the old Imperial Railways of North China (Peking-Mukden Line) by entering into a contract with a firm of London engineers to purchase all its requirements in Great Britain. The original loan agreement for the above railway made no provision for a purchasing commission. It was a clean cut financial transaction in which because of the international politics involved, the Chinese Government was conceded terms lower than it could have received had the loan been contracted on a business basis. The British and Chinese Corporation simply exacted for the proper execution of the loan contract and supervision over the operation of the line, that they should appoint the Chief Engineer. After the Chinese authorities laid this extra burden on the line, the British banking group requested that in all fairness it should be paid the same commission for performing the same service in subsequent railway loan agreements. The precedent once established, became recognized as a permanent and legitimate charge on subsequent lines and a source of profit to the bankers of all other countries advancing funds for Chinese railway construction. The Chinese, on many occasions have pointed to this purchasing commission as an instance of how they have been unfairly treated by international finance and as their authorities have never confessed to their own shortsightedness, this impression has been permitted to take root and grow, until now it is commonly accepted by the Chinese as one of the most flagrant abuses on the part of "foreign financial imperialism."

That a five per cent. purchasing commission is somewhat excessive is true ; that is all that can be said against it. But it is well to remember that it was never demanded or imposed by the foreign bankers as a condition to a loan agreement until the Chinese themselves created a precedent they were quite willing to follow in all subsequent loan transactions. Times and conditions have changed. Future railway loan agreements entered into between the Chinese Government and responsible groups of foreign bankers, will be devoid of international politics and negotiated as a clean-cut business proposition. The banking group, acting on behalf of its prospective bondholders, will insist upon the strictest economy in construction, in order to reduce the capital outlay to a minimum. There will be no provision or room for "squeeze" or any other diversion of loan funds into the pockets of favored officials or, for undue profits to the bankers or their friends. There will be no purchasing commission set aside for the bankers or for any firm designated to act for them as such.

The Chinese Ministry of Railways will insist upon the right to make its own purchases in the open market. To obtain the fullest and freest competition and rock-bottom c.i.f. prices, the tenders may be advertised in London and New York, so that every approved railway material manufacturer in the country furnishing the loan, will enjoy an equal opportunity to compete.

The establishment at this time of a Chinese Government Railway Purchasing Agency in New York or London, while premature, can only be taken as an indication that the Railway Ministry is strengthening its credit position and paving the way towards the elimination of any future purchasing commission in loan transactions.

The question of how and where purchases of materials are to be made, will undoubtedly become a matter of negotiation and, if the loan is raised exclusively in one country and provision made for preference to the materials of that country, the establishment of a purchasing office in its capital will be stipulated as part of the bargain. On the other hand, if the loan is contracted through an international group of bankers, tenders will be invited in China.

Viewed from this angle, the opening of a purchasing agency in London has much to commend it, notwithstanding that there exists strong and convincing arguments why all the purchasing should be concentrated under control of the Central Purchasing Office of the Ministry of Railways in China. The wisdom of such a step depends solely upon the conditions of the loan agreement and whether or not preference in supplying materials is given to the nation furnishing the funds. In the present instance, where it is hoped that a portion of the British Boxer Indemnity will be used for new railway construction or rehabilitation, the materials should all be purchased as a matter of equity from British manufacturers, and an assurance given beforehand that they will be conceded equal treatment. The old purchasing system aroused considerable opposition and protests from British manufacturers who, rightly or wrongly, felt that they were being discriminated against in favor of a few preferred concerns represented in China by the firm closely allied with the official Purchasing Agents. Although there was little basis for this dissatisfaction, the conditions which gave rise to it have long since disappeared. To obviate any further cause for protests, it is not unwise at this time for the Ministry of Railways to provide some guarantee that if any portion of the Boxer Indemnity is allocated for railway construction, all British equipment manufacturers, irrespective of whether or not they maintain offices or agencies in China, will be given the fullest opportunity to compete. At the same time it is an assurance that the strictest economy will prevail in the expenditure of the funds.

On the other hand, until the Chinese Government's finances are on a more solid basis, with its credit fully re-established abroad, it would be impractical and unwise to purchase direct from the manufacturer. It may be some years before this ideal stage is reached ; until then, the practice of inviting tenders in China where proper guarantees for financing the orders are available, is the most judicious course to pursue.

It is possible that the Mukden authorities, operating independently of Nanking, may have the ready funds to make cash payments for materials on their delivery alongside the steamer in Europe or America, but even this procedure, is not to be commended, unless the materials have been properly inspected and accepted by an agent of the government before shipment and payment. No matter how much is said for this system as a business proposition, it only tends to compicate and confuse the general political situation and make for a loss of prestige of the Central Government and its Ministry of Railways. If the Chinese nation is now unified and Mukden acknowledges the supremacy of the Central Government, any independent railway activities, either in purchasing for or in the construction of state railways implies that this allegiance is a fiction. There is every evidence to support the statement that Mukden while professing allegiance to Nanking, considers itself autonomous, if not independent, when it comes to negotiating loans for new railway construction or the financing of large orders for its railway requirements. As long as the Mukden Government can pay cash, there can be no objection to direct dealing with American manufacturers, but when the question of its credit is involved and its bonds or notes are offered in payment, the transaction is fraught with grave risks. In fact, these notes or bonds could not be offered for sale on the open market in Europe or America without automatically inviting the official opposition of the various Governments signatories to the Consortium Agreement. For any of these governments to sanction or approve of the issuing of such provincial obligations on their respective financial markets, is equivalent to recognizing the political independence of the provinces.

Direct purchasing may have its advantages where the various railway administrations have the cash or can provide irrevocable letters of credit to guarantee the terms of payment to the manufacturers. In the latter case, it is simply a question of whether a responsible bank is willing to finance the railway administration or provincial government, in preference to a commercial firm. If no long time credits are involved, there are many banks who would be willing to finance these direct orders and make the profit that would otherwise accrue to the middleman. There is increasing evidence that some foreign banks are willing to underwrite such direct financing of orders for materials and assume the risk themselves, rather than lose a profitable piece of business that might go to a competitor financing the middleman. Once the banks enter into competition for this business and accept the guarantees of the Chinese purchasers of materials, the way is opened for the gradual elimination of the commercial engineering firm representing the manufacturers in China. It is quite apparent that some of the larger Chinese banking institutions have created a situation that compels the foreign banks to follow the same methods or lose business. This competition between the banks resulting from the remarkable growth in the past decade of native financial institutions, may, in the end, revolutionize time honored methods of conducting business in China.

This tendency is to be regretted, as after all, the present system with all its drawbacks, has been evolved by a century of trading as the only safe way of doing business in China ; the only guarantee that the interests of both manufacturer and customer will be adequately safeguarded. But, in the keen competition for orders and profits, with the world to shop in and check up on quotations, the Chinese will always have the advantage if they can provide the necessary banking guarantees and facilities for payments and are willing to assume the risks involved in shipping, landing and delivery of the merchandise.

If the Chinese railway authorities or industrialists can obtain the financial support and guarantees of responsible Chinese banks in placing orders direct with the foreign manufacturer and accepts before shipment the okay of some reputable firm of consulting or inspecting engineers that the material conforms to specifications and is then willing to assume all the risks attendant upon delivery assembling and erection of the plant at the port of destination in China, few foreign manufacturers will decline the business. His responsibility ends with delivery of the merchandise alongside the steamer. But, no reliable manufacturer of engineering plant or railway equipment who hopes to establish a permanent business in China could afford at this juncture, to accept any important engineering contract that does not carry with it, assembling or erection of the plant by their own expert engineers and some provision or guarantee for its efficient operation over a stated period of time. This calls for service that can only be rendered by maintaining an office or an agency in China.

G.B.R.

The Secret of Japan's Trading Success

Organization and Efficiency; Not Low Wages, Inhuman Treatment of Workers or Unfair Competition

The Report on "The Cotton Industry of Japan and China" by Mr. Arno S. Pearse, Secretary of the International Federation of Master Cotton Spinner's and Manufacturer's Associations completely absolves Japan from the charges of Unfair Practices and Competition in the Cotton Industry, and supports the conclusions reached by the Publisher of The "Far Eastern Review," after investigating the Bombay Cotton Mill Industry in August, 1926.

By GEORGE BRONSON REA

Japan's success in the cotton industry in due solely to the efficient organization of three concerns, co-operating with the spinning mills—The Japan Cotton Trading Company, Ltd., headed by Mr. M. Kita and the Oriental Cotton Trading Company, Ltd., (a Mitsui subsidiary) presided over by Mr. T. Kodama and the Gosho Company. These three concerns handle over fifty per cent. of the raw cotton purchased in India and most of the exports from America. They has branches in all the cotton producing countries as well as in the markets for finished products. Their agents buy the crop in advance at the source, generally at a time of seasonal low prices and in sufficient quantities to last their mills from two to five months. These Japanese organizations enjoy no special or superior cotton buying or manufacturing wisdom. If cotton advances when they are stocked up, the Japanese simply buy more to average. Japan averages down, puts up the money and sticks it out. She makes her bet and does not hedge. They are good speculators and so far have enjoyed good luck.

In addition, Japan is able to compete because her manufacturing costs are said to be eight to eighteen per cent. below her competitors. The spinning companies accumulated an immense wartime surplus. They have a marvelous control over labor; they have installed the fastest automatic looms and make most of their machinery at home. They have a domestic and Asiatic market at their doors which gives them a geographical advantage over others. All this, with the addition of a smart co-operation and intelligent purchasing and marketing, even to the smallest detail, gives them an advantage that can only be wrested from them by the same methods. Japan is due to continue as a textile leader for many years. There may be more of a smack of the trust domination than of calendar buying and co-operative merchandising to account for her success, but in these days of huge industrial amalgamations, it is difficult to criticize this feature. In effect, many of the Japanese advantages are natural. In the others, England and the United States can copy her systems.

THREE years ago, the columns of the British press were filled with denuciatory articles of Japan's alleged "unfair competition" in cotton piece goods and yarns. Japan had signed the International Labor Convention of 1919 regulating the hours of work in cotton mills and abolishing the night shift for women and young persons but had refrained from ratifying it until she had made the necessary adjustments in her internal economic machinery to meet the changed conditions. Her delay in enforcing these Western ideals of labor legislation, was construed by her competitors as a proof that she did not intend to abide by them. The bitter and violent anti-Japanese agitation in Great Britain and in India was actually carried to the point where it was seriously proposed to have the League of Nations impose an international boycott on the transport of Japanese goods until she complied with the new regulations. Japan fought against great odds, handicapped by the fact that her side of the case, received little or no publicity in the English language press of the world. The Japanese Cotton Spinner's Association and other interested trade bodies time and again appealed to the Indian Government for a square deal, setting forth the facts surrounding their business and requesting that a commission of experts be sent to Japan at the expense of the Japanese, to investigate conditions surrounding the cotton industry in that country.

The Publisher of THE FAR EASTERN REVIEW made a special visit in 1926 to Bombay for the purpose of investigating on the ground these charges against Japan and after a month of study became convinced that Japan's success in India was due entirely to the superior business organization and methods of her traders.

The findings of THE FAR EASTERN REVIEW stirred up acrimonious rejoinders, but it woke the British cotton industry to a realization of what it was up against. Individual experts and representatives of British and Indian cotton association conducted investigations of Japanese mill conditions and methods of conducting business and all arrived at the same conclusion as the Publisher of this magazine. The dispute was finally taken to the International Federation of Master Cotton Spinner's and Manufacturers Associations and this organization dispatched its secretary to Japan to make an exhaustive study and report on the cotton industry in that country and China. Mr. Arno S. Pearse, the expert who conducted this inquiry, has recently published his report, under the title of "The Cotton Industry of Japan and China."

The Japanese are to be congratulated by the complete vindication of their commercial honor unfolded in this report of the highest expert authority connected with the cotton mill industry. **Sales Organization** and not **Low Wages** or **Unfair Competition** is in Mr. Pearse's estimation, the secret of Japan's success. **"The reproach of unfair competition has frequently been levelled against the Japanese cotton industry. I have tried to find any justification for such an accusation, but without success," declares Mr. Pearse.**

That these reports all testifying to the efficiency of Japan's trading and manufacturing methods, have been brought forcibly home to their competitors, is attested to by the fact that the British have been compelled to adopt the same methods in reorganizing their cotton industry in order to compete with their most formidable rival. Generally speaking, each section of the

British cotton trade works in a watertight compartment. There is no organization, no co-operation. Competition is free and the internecine struggle for business resulting in cutting prices against their own industry, has proved fatal to its efficiency. In order to combat this situation, the Lancashire Cotton Corporation, Ltd., has been formed to combine the largest possible number of spinning mills, organize them and provide the capital to finance them properly. Between fifty and sixty British mills have consented to join the Corporation and a large number more are in negotiation. The Corporation's object is buy the raw cotton collectively for its constituent mills, standardize outputs for certain markets and concentrate the merchandizing under one management. In other words, the British plan for the resuscitation of their major industry, follows the identical lines originated by their Japanese competitors, and which have enabled the latter successfully to expand their trade in countries and markets hitherto monopolized by the British.

The following brief facts concerning the operation of the three big Japanese cotton trading companies will help to a better understanding of Mr. Pearse's report.

Not only do these three Japanese concerns handle the bulk of their own country's cotton requirements but they have also invaded foreign fields hitherto monopolized by other traders and to an increasing extent are making themselves felt as a formidable factor in world markets. Their strategic buying position at the main sources of supply has enabled them to enter the field of world competition, supplying raw cotton to the manufacturers and factors of other countries. The Japan Cotton Trading Company, Ltd., presided over by Mr. Matazo Kita, one of the most astute and experienced experts in the trade, is taking the lead in this campaign for the extension of Japan's commercial activities. This concern, with a subscribed capital of Yen 50,000,000 (Y.26,000,000 paid up) and reserves of nearly Y.23,000,000 has established itself in every important cotton center in the world, maintaining branches in such places in as New York, Dallas, Houston, and New Orleans in the United States ; Bombay, Calcutta and Karachi in India, Alexandria in Egypt and Mombasa Dar-es-Salaam and Jinja in East Africa. In Europe it has branches in Liverpool, London, Bremen, Hamburg and Milan with correspondents in all the principal cities. Last year it sold more Indian cotton to British mills than the old established British importers of this staple. They have increased the Japanese purchases of Egyptian cotton from 30,000 to 60,000 bales in three years and also handle the long staple product of Uganda through the port of Mombasa, where the steamers of the Osaka Shosen Kaisha and a branch of the Yokohama Specie Bank co-operate with them in building up the African trade. Through their Alexandria office they have invaded the markets of the Near East, Turkey and the Balkan States. Here they are ably assisted by the Yokohama Specie Bank branch at Alexandria and the European service of the Nippon Yusen Kaisha and other Japanese steamship lines. Some idea of the extent to the operations of this company may be gathered from its balance sheet for the half year ending March 31, 1929, when the usual ten per cent. dividend was declared.

ASSETS

Capital Unpaid	Y.24,000,000.00
Land	3,846,111.65
Factories and Buildings ..	5,632,852.85
Machinery ..	2,193,907.03
Furniture and Fitting ..	133,000.00
Bonds and Shares ..	11,771,722.83
Merchandise	45,277,906.83
Customers Account	12,741,870.95
Merchandise to Arrive	15,632,511.25
Bills Receivable	21,034,035.24
Bank Deposits	6,116,161.36
Branches Account	5,544,092.91
Sundry Accounts Receivable	2,050,068.22
Guarantee Deposits	49,654.79
Accessories and Supplies	275,871.75
Fire Ins. Premium Unexpired	23,440.27
Cash on hand	74,091.28
	Y.156,397,299.21

LIABILITIES

Capital Subscribed	Y.50,000,000.00
Reserve Funds	22,100,000.00
Pension Fund	100,000.00
Dividend Unclaimed	10,657.50
Staff Trust Deposits	481,353.54
Charges Payable	532,731.45
Bills Payable	79,981,759.92
Sundry Accounts Payable	1,248,229.01
Undivided Profit Brought forward ..	173,973.80
Net Profit for this half year	1,768,593.99
	Y.156,397,299.21

The net profit for the half year and undivided profit brought forward from the last term was disposed of by placing Y.250,000 to reserves, Y.90,000 as bonus for the directors, dividends at the rate of ten per cent. Y. 1,300,000 and carrying forward as undivided profit Y.302,567. It will be seen from the above report that the company is in a strong financial position, able to meet any sudden demand upon its resources through a sudden change in market conditions.

Although the main activities of the Japan Cotton Trading Company are confined to importing raw cotton and exporting yarns and piece goods, it also conducts a large business in wool through its offices in Sydney and Buenos Aires. It handles jute from India for the Japanese mills and the European markets, raw silk from Japan, rice from Rangoon and Saigon and engages in other general lines of trade.

The Oriental Cotton Trading Company, Ltd., (Toyo Menka) is an equally important factor in the trade. For many years this organization was known as the Cotton Department of the Mitsui Bussan Kaisha, but in 1920 it was separated from the parent company and reorganized under its present style and name with a capital of Y.25,000,000. The Mitsui's were the first Japanese to enter the Indian field as direct purchasers of raw cotton and since 1893 have taken and maintained the lead in the export of this staple to Japan and China. They now handle about one-third or some 550,000 bales of the total exports of Indian cotton to China and Japan. Its organization in India extends to every cotton growing district with branches in every large city and more than 170 sub-agencies scattered over the country. It operates its own gins and presses, ships in its own steamships, finances its operations through

Mr. Matazo Kita, President of the Japan Cotton Trading Company, Ltd., One of the Most Powerful Factors in the World's Cotton Trade

its own bank and places its own insurance. The Toyo Menka is also active in the African field, having a branch in Jinja in Uganda. It has also entered the manufacturing field in Bombay, having acquired the Diamond Mill and reorganized it into a Japanese controlled property. Some idea of the operations of the three big Japanese cotton factories can be seen from the following figures extracted from "Indian Cotton Facts," a most comprehensive collection of statistics compiled yearly by the Toyo Menka.

Out of a total of 3,500,000 bales of Indian cotton exported in 1928, 1,563,000 went to Japan and 351,000 to China. Of this, 1,237,000 bales were shipped through the port of Bombay; the Toyo Menka handling 19.31 per cent. the Nippon Menkwa, 16.40 per cent. and the Gosho Company 18.11 percent. Out of a total of 300,000 bales shipped through Bombay for the China market in 1928, the Toyo Menka handled 83,000 bales, the Nippon Menkwa, 86,000 and the Gosho Company, 24,000, or 64 per cent, of the total between these three firms.

Mr. Pearse's report, written in a simple, straightforward and lucid manner, should be read and digested by everybody interested in Far Eastern trade. It is not often that an expert of international reputation can be found to investigate and impartially report on industrial matters which have such an important bearing on the prosperity of his own country. The following extracts from this able and comprehensive document gives an accurate idea of his findings which completely exonerates Japan from the accusations hurled against her in the heat of an intense trade war.

"The Japanese cotton spinning and manufacturing industry could never have achieved her present position without that group instinct which is generated by the family system, and which is still characteristic of Japan. The individual is only a small entity, he will put his firm first, and the firm puts itself in the background, but works for the national welfare. The Emperor is still the personification of Deity, and every Japanese claims to be part and parcel of his family; the whole State is one "trust." It is that spirit which has been the cause of Japan's rapid development, and it is the same group instinct that has led to the huge combinations in the Japanese cotton industry.

"I would attribute as a second cause for Japan's rapid advancement, what we in Europe call speculation. I quote from the official publication of the Japan Cotton Spinner's Association. It says: 'At the commencement of hostilities the mills in Japan had to contract purchases of raw cotton at about 30 yen per picul to cover their requirements for a whole year or longer, twice as much as they used to do in the normal time, lest a continued warfare on the ocean might bring a disastrous famine of raw cotton to the islands of the Orient remote from the seat of cotton plantations. In the course of time, price of raw cotton steadily advanced to 100 yen and more, followed by a still greater advance of cotton yarn price in Japan.' None of that cotton was hedged. It was a great surprise to me that not one of the big combines and very few, if any, of the financially weak mills hedge their cotton purchases. I made absolutely sure about this, and asked the presidents of the cotton combines, several of their mill managers, and all the leading cotton merchants, and I was assured time after time, that it is quite a common occurrence for these combines to have 30,000, 50,000, and at times even 80,000 bales unhedged. If the price goes against them they buy more cotton, and they argue that, after all, 30,000 bales only represent one month's consumption for the average combine, and cannot be regarded as a speculation.

"The profits made in this way during the war have enabled them to build up such huge reserves that the average reserves of all the mills belonging to the Japan Cotton Spinner's Association, which represents to-day 97 per cent. of the total spindles of Japan, is over 60 per cent. of the paid-up capital, and that of the large combines substantially over 100 per cent. of their paid-up capital. With these huge war profits, which have amounted, according to the official showing of the Association, to several million pounds sterling for each combine, they have extended their mills in Japan, given bonus shares, they have added to the reserves, and finally they built with this superabundance of money mills in China which to-day represent more than one-third of the total spindles in China.

"The third cause of the strength of the Japanese cotton industry is to be found in the organization. In the first instance, we have the four mill combines controlling 60 per cent. of the whole industry. Then, we have three very large cotton buying firms, which also undertake the selling of the manufactured goods and have cut out any intermediary between themselves and the wholesale dealer in China, India, etc. These cotton importers have houses in many parts in China, India, Java, etc., and handle the manufactured goods at a very low profit. The writer has been informed on good authority that on greys they do not reckon to make more than I per cent., on dyed and bleached goods 2 per cent., and prints 2½ per cent., whilst the European houses sell to an importer, who in the case of China, has to employ almost always a compradore, and I was able to ascertain from one of these European importers, that he made at least 3 per cent. on greys. He had to pay a compradore 1 to 1½ per cent. Therefore European goods will certainly be dearer by at least 4½ per cent. on account of not having a direct link between European exporting houses and wholesale dealers up-country.

"As the goods are packed in the Japanese mills or at the finishing works without being sent to and fro. as in Lancashire (between manufacturer, shipping house, finisher and again shipping house) an additional saving results in favor of the Japanese price, which is not inconsiderable in the case of low class staple goods.

"The very wealthy position of the mill combines makes the cotton merchants anxious to sell to them, and for that reason, the mills always enjoy the benefit of the favorable speculation of the cotton merchants. In a list obtained from an American cotton exporter one can see distincly that prices in Osaka are from 2 to 5 per cent. cheaper than the cost of replacement in the United States.

"As the last advantage, but still a very important one, one must reckon the cheaper cost of labor in spinning as well as in weaving. From all the information collected it would appear that the labor cost for spinning 20's is about ½*d.* per pound cheaper than that of the cheapest countries in Europe. As regards the labor cost of weaving, the fact that the average number of looms per operative in the associated mills is 5.5 against 3 on the continent and 4 in England shows that there is a consideralbe advantage there. We must further take into consideration the fact that the wage for looking after 5.5 looms in Japan is 3*s.* 6d. per day, and the production per loom is higher, certainly not lower, than in England for similar cloths.

"Japan's overhead expenses are high owing to freight, packing insurance on important spinning machinery and owing to the very extensive welfare work. Europe has a great advantage under this heading over Japan, but, of course, the very large profits made have enabled the industry to write-down considerably the values of machinery and buildings.

"The workpeople are docile; there may be occasional strikes, but as 80 per cent. of all the operatives are girls between the ages of 14 and 20, who remain in the mill only for about two to three years, they are not likely to join any unions in large numbers.

"For the present, I consider that Japan has reached or is near saturation point, particularly as the Japanese have built in China a large number of mills, which, of course, affect the export figures of Japan; but Japanese are extreme optimists, and they will not stop cotton mill building. Cotton mills pay better than any other industry in Japan. It was originally the idea that the Japanese mills in China should spin the coarse counts and that eventually the Japanese mills should send these coarse counts to Japan, whilst the mills in Japan should concentrate on spinning medium and fine counts. Evidently this plan has miscarried. Certainly, Japan is spinning much finer than she used to do a few years ago, but at the same time, China has not limited herself to spinning coarse counts; 40's is quite a common number in China, though, of course, the bulk is 16's.

"The welfare work undertaken by the Japanese mills calls for the admiration of anyone who takes the trouble to investigate it impartially. Labor agitators and too zealous missionaries have frequently misrepresented this welfare work. About 80 per cent. of the operatives live on the premises, and two hours are daily devoted to schooling. Not only is the ordinary school curriculum provided, but practical subjects, and even ethics are taught. The mill operative of Japan are all able to read and write, and their general standard of education must be quite up to that of the mill operatives of Europe. Every operative has a bath daily and the dormitories in which the operatives sleep are an example of cleanliness and comfort. In the past the mill operatives of Japan might have been none too well-treated, but they are to-day well-cared for. Those living on mill premises are better off than in their own homes. The Japanese mill operative, in spite of only temporary employment in the mill, is very nimble and quite on a par with most

European cotton-mill operatives, due to the excellent training and supervision in the mills.

"Technical changes in the Japanese cotton industry take place rapidly; the last few years have witnesses the almost general adoption by the mills of the big combines, of the warp-stop motion on looms, so that now the average number of Japan's ordinary looms attended to by one girl is 5.5, against 3.5 a few years ago (I may mention that in one mill several girls looked after 10 ordinary looms with one helper between 20 looms). The last two years have seen a more general introduction of automatic looms, of which over 12,000 are now working in Japan, and this mass-production movement is spreading rapidly. These and other changes have reduced the cost of weaving, and consequently particulars on this subject collected a few years ago are now out of date. The mills are spinning finer counts now than even last year.

"Nowhere in the world do we find in our industry such an excellent system of buying cotton from the same firm which sell the manufactured cotton goods abroad, and which, as far as India and China are concerned, perform a real barter business; the system of specialization of working only very few qualities in each mill is nowhere in Europe as well established as in Japan; the future exchange for dealing in cotton yarn is also unique, and, as regards technical innovations, I refer to what I shall have to say on the Toyoda automatic loom and several other appliances.

"The reproach of unfair competition has frequently been levelled against the Japanese cotton industry. I have tried to find any justification for such an accusation, but without success.

"The individual wages of Japan are higher than in India. The fact that there are in Japan many dexterous weavers, naturally nimble and that they are not restricted by trade union regulations to half the number of looms to which they are able to attend, cannot be regarded as unfair competition. The Japanese mills are now working a morning and an afternoon shift of 8½ hours each, night-work is abolished as from 1st July, 1929, but was given up by many before that period.

"The housing and feeding of the girl operatives in Japan are better than in their own houses. In short, I did not succeed in tracing any unfair competition; it may have existed at one time, but it is absent to-day. Imitation of trade-marks and such similar offences are infantile diseases in new industries of any country; they seem to have disappeared through the guidance of trade associations.

"It is that handful of Japanese with outstanding capabilities at the head of big Japanese combines, who are the backbone of the cotton industry of Japan, and it may be remarked in passing that no other industry in Japan is on such a sound footing as the cotton industry. In China also these very men have placed the cotton industry on a much higher plane since they embarked on establishing mills there.

"Though the group spirit and the consequent big combinations of Japan are still missing in China, it must be realized that this country is still in its infancy as regards cotton mill industry, whilst Japan has arrived very near to its saturation point. Rapid development of the cotton mill industry is bound to take place in China. No country is capable of consuming more cotton goods than China, that has wakened up from its sleep of centuries, and cotton clothing is certain to receive its share in the development.

"In the cost of spinning, China has a small advantage even over Japan owing to lower wages and lower overhead charges, but this lower wage-scale is not enough to offset the inefficient labor in weaving. Two looms to a weaver is the optimum average; this limitation is to a great extent due to the old custom of binding up the feet of female children, and consequently women cannot move on their feet rapidly enough to enable them to attend to more looms than two. As this custom is fast disappearing we may soon see an increase in the number of looms per operative.

"The Chinese mill operative as a whole is still inferior to the Japanese, but as he has a mechanical bent he may improve quickly. Education of the Chinese mill operative is on a very low par.

"Welfare work in China is not as expensive as in Japan, nor is as much provided; evidently the Chinese operative prefers to live in his accustomed dirty surroundings. A cotton mill operative population is being formed in Shanghai, and in spite of the present inferiority of labor in China, one cannot help but come to the conclusion that China will develop in the near future her mill industry.

"The establishment of mills in China by the Japanese has shown the Chinese how to run mills on efficient lines, and they have very well imitated the Japanese system. The Japanese are anxious for Europeans to assist them in the further development of the Chinese mill industry, partly for political and partly for financial reasons. The Chinese would not welcome such action, and some of them have expressed to the writer their intention of taking the Japanese-owned mills in China out of existence."

New 800 Feet Piers for Hongkong

THE new development plans of the Hongkong & Kowloon Wharf and Godown Company, Ltd., referred to at the last annual meeting of the company, are taking shape in the construction of a new wharf that will be 800 feet long and 60 feet wide. The necessary permission to carry on with this work has now been given, but this is only part of a scheme which the company has prepared. The full scheme provides for two new wharves, both 800 feet long, and the reconstruction of one of the existing wharves at Kowloon.

When completed the new wharf will be about 150 feet longer than the present largest one. The existing No. 1 is 662 feet and the No. 5 is 657 feet. These are the wharves used to berth the vessels of the Canadian Pacific Company, the Dollar Line, American Mail Line, Nippon Yusen Kaisha, etc., but in view of shipping developments on the Pacific route, the present wharves will not offer adequate berthing facilities for new liners either planned or under construction.

The company has long realized the necessity for the provision of additional berthing facilities in Hongkong and has continuously made representations with regard to a scheme of development it had prepared. Now the necessary permission to proceed with the first part of the scheme, the construction of a new 800 foot wharf, has been given. Plans are now in course of preparation by experts and up to the moment no decision has been made regarding the nature of the piles to be used or details of the work. The new wharf, however, will embody the most modern methods of wharf construction and when completed will considerably add to the shipping facilities of the port. Naturally an extremely heavy capital expenditure is involved and it is anticipated that the construction work will occupy a year.

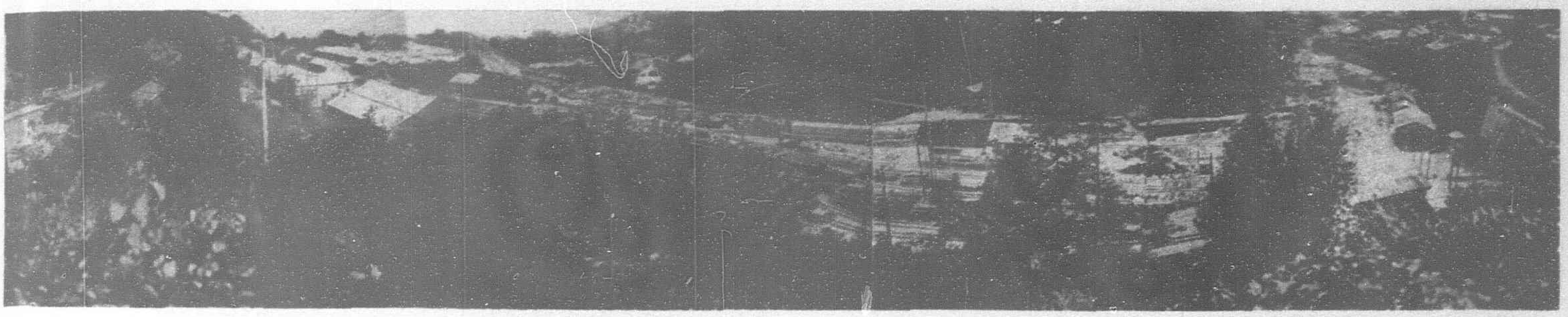
Negotiations with the Admiralty have been necessary and concurrence has now been given to the construction of the new wharf 120 feet from the Kowloon camber, subject to a guarantee being given by the Company that free space for manœuvring lighters, etc., in and out of the victualling yard camber will be maintained during construction of the wharf and afterwards when ships are berthed alongside.

The new wharf will run parallel to the existing ones and the lowest level of water at it will be 30 feet. It will also include up-to-date facilities for the handling of cargo for storage in the godowns.

Developments of this nature were foreshadowed at the annual meeting of the company when the Hon. Mr. B. D. F. Beith stated that the wharf accommodation was severely taxed in 1928, there being occasions when ships were compelled to discharge in the stream as no wharf was available. Not only is there a need for additional wharves but there is a growing demand for wharves capable of accommodating larger ships.

The N. D. L. liner *Columbus*, which is due at Hongkong in March, is nearly 750 feet long, while the new Canadian Pacific vessel, *Empress of Japan*, is longer than the other vessels of the company now making Hongkong a port of call. In addition other huge liners are due in Hongkong in the future and it is essential that there should be berthing facilities for them.

The present plant of the Hongkong & Kowloon Wharf and Godown Company, consists of a wharf and warehouse system with wharves capable of berthing eight steamers 650 feet long with a draught of 31 feet at low water. The total capacity of the warehouses is over 300,000 measurement tons, with the most modern equipment and machinery for rapid handling of cargo. A light railway system connects the whole of the company's premises, wharves and warehouses with direct railway connections with the Kowloon-Canton Line. There are five locomotive cranes with lifting capacities of 2 to 25 tons, eighty lighters of 100 to 300 tons capacity and nine steam tugs. The wharf extensions planned will call for considerable additions to the mechanical equipment.



General View of the East Side Plant of the Tanna Tunnel at Atami

The Tanna Tunnel

By E. KUSANO

RÉSUMÉ : The relocation for eliminating a grade of 2½ per cent. on the Tokaido Main Line (between Tokio and Kobe) of the Government Railways requires the construction of a 30 miles cut-off in mountainous country and the driving of a double track tunnel 5 miles long to avoid the present line over the Hakone pass. The new cut-off is called the Atami Line, and replaces 37.5 miles of mountainous line having an altitude of 1,500-ft.

This tunnel is located near Atami, a well-known hot-spring resort. In length it is the nineteenth railway tunnel in the world and the second in Japan.

The geological formation through which the tunnel is pierced consists mainly of agglomerate containing andesite of various kinds.

Tunnel work was commenced on July 1918 from both ends. The excavation proceeded rather smoothly up to February 1922, when the heading reached 5,000-ft. on the west side and up to November 1924 when the heading reached 8,000-ft. on the east.

Since then, great faults were encountered and serious difficulties due to enormous earth pressure and inrushes of water with extraordinary high pressure is retarding progress.

For example, on May 1925 on the west side when the heading entered the fault zone the maximum quantity of water reached 123 cub. ft. per sec. and several thousand cubic yards of mud was forced out and a serious accident occurred.

To drive through the fault zone various methods such as high pressure grouting, compressed air with small shield and lining segments were adopted with success.

The tunnel passes under the Tanna basin, a circular depression about 1.3 miles in diameter at 770-ft. above sea level. Judging from the results of test boring this basin was caused by dislocations and was the bed of an ancient lake. Therefore, several faults of this kind are to be driven through. For the drainage, a permanent tunnel is built running parallel to the main tunnel on each side.

At present the heading has advanced as follows :

Total length	*25,614-ft.*
East side (Atami side)	*10,005-ft.*
West side (Numazu side)	*9,959-ft.*

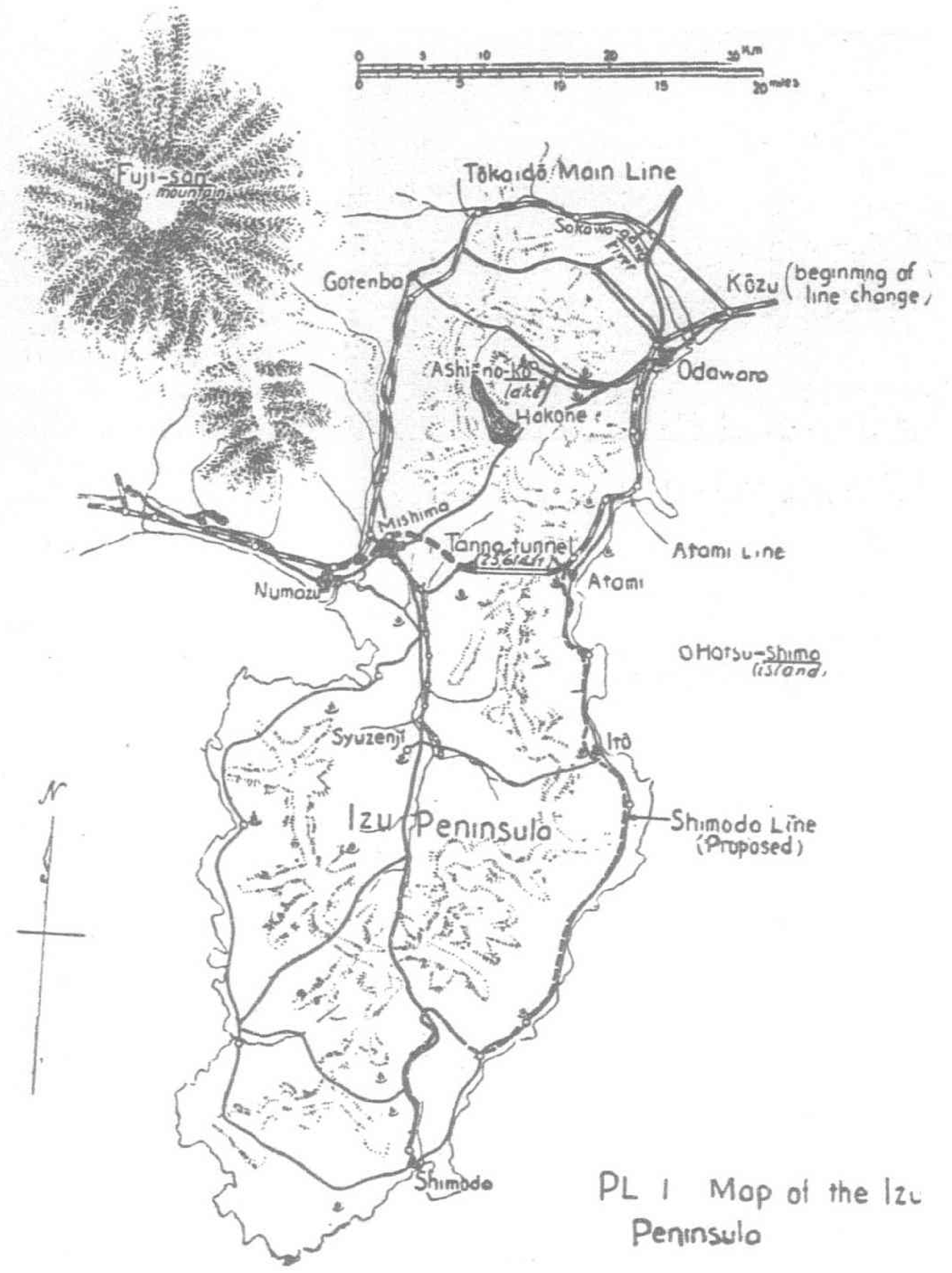
Discharge from the drain tunnel is

East side (Atami side)	*32 cub. ft. per sec.*
West side (Numazu side)	*38 cub. ft. per sec.*

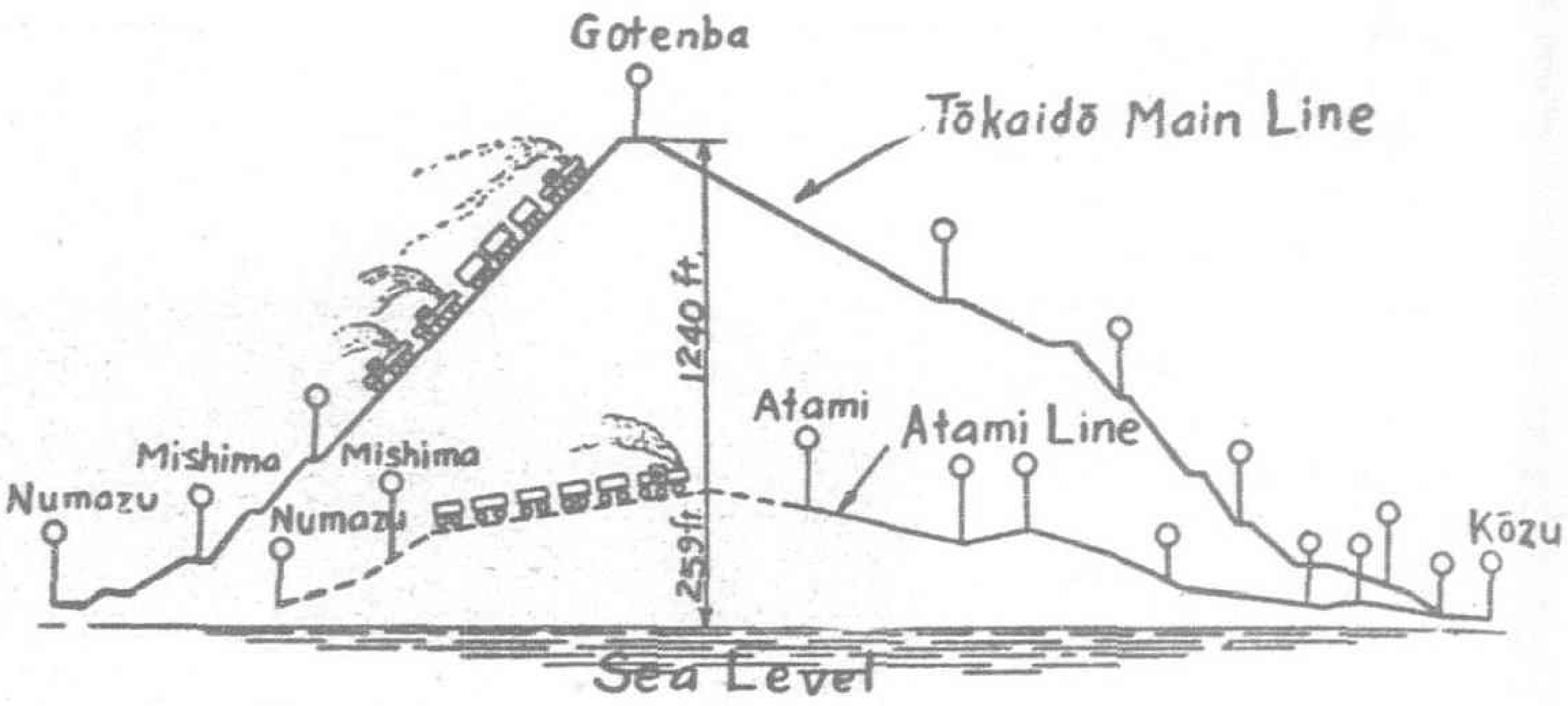
As a large quantity of water has continuously flowed out in the tunnel, the lowering of the ground water table has caused the drying up of the springs and wells in the Tanna basin. This threatens the welfare of the farmers and as a relief measure, water works were constructed. A reservoir for irrigation has been planned and is now being carried out.

PRESERVERING in the face of innumerable obstacles to the completion of the Tanna Tunnel the Japanese engineers are at last able to see ahead the successful conclusion of this monumental work. This tunnel and the problems connected with it have been unique in the history of such excavation throughout the world. While almost all of the problems encountered have individual precedents in some other project, a greater variety of geological phenomena were encountered in the excavation of the initial stage of the Tanna Tunnel than have ever been found elsewhere in any single undertaking.

Although from the outset it was realized that difficulty in excavation would be encountered it was decided that the benefits to be derived from the use of this route far outweighed the cost necessary in time and money. This tunnel will be used on the main line of the Japanese Government railways between the two great centers of industry and population, Tokyo and Osaka. Compared with the present main line which skirts the base of Mount Fuji, the new route through the Tanna Tunnel will be 7.2 miles less in distance between the point were the old and the new lines separate at the city of Kozu on the Tokyo side of the mountains and



PL I Map of the Izu Peninsula



Comparative Table

	Present L.	Atami L.
Length of the Line (mile)	37.5	30.3
Max. Grade	1/40	1/100
Lenth of Max. Grade	12.1	7.3
Min. Radius of Curvature (Chain) ..	20	20
Length of Min. Curvature	6.3	3.0
Equivalent Length of Line (Mile).. ..	74.2	39.2
Radio of Tractive Force	1.0	25.30
Summit Elevation (feet)	1,499	259

the junction at Numazu on the Osaka side of this difficult piece of country. Other comparisons are a maximum grade of $\frac{1}{100}$ for the new route and $\frac{1}{40}$ for the old, while the length of the maximum grade is 7.3 miles over the new route and 12.1 miles for the old. The ratio of tractive force will be 2.5-3 through the Tanna Tunnel route and one over the present line. At the same time the new cutoff will have a summit elevation of only 259 feet as compared with 1,499 feet at present. A greater comparison is perhaps to be found in the equivalent length of the old and new routes, the section over the Tanna Tunnel being 39.2 miles and 74.2 miles for the present main line. The accompanying map shows in general the change which will be made.

The work will probably be completed within the estimated cost of Y.65,000,000 but the change is expected to result in a three-fold increase in the traffic capacity of the Tokaido main Line and the express train time over the short distance between Kozu and Numazu will be cut by about 30 minutes.

The Tanna Tunnel will carry a double track and have a length of 25,614 feet and will be the principal part of what will be known as the Atami Cutoff. The Atami line on which this Tunnel is being constructed will replace the existing 37 mile section between Kosu and Numazu, of the Tokaido main line which crosses the Hakone mountain range at an altitude of 1,500 feet, under an almost continuous grade of $\frac{1}{40}$. Other disadvantages of the present line lie in the fact that in that it runs along the Sakawa river and is openly exposed to danger from floods and landslides, is difficult to maintain and in the event of a severe earthquake would be greatly damaged.

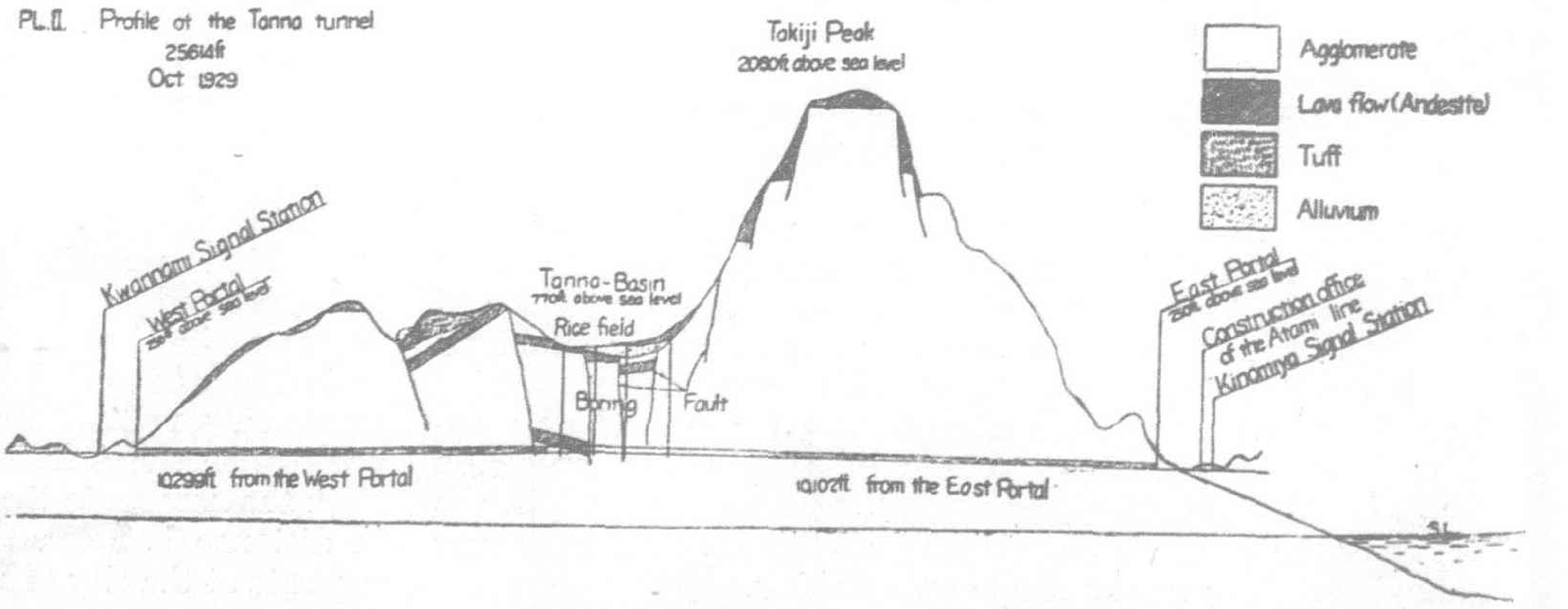
Investigation of alternative routes began in 1913 and before deciding on the location, a geological investigation was carried out but could not be accurately accomplished on account of the weathering zone which was unusually thick due to the humid atmosphere and hot temperature in this section and the scarcity of outcrops.

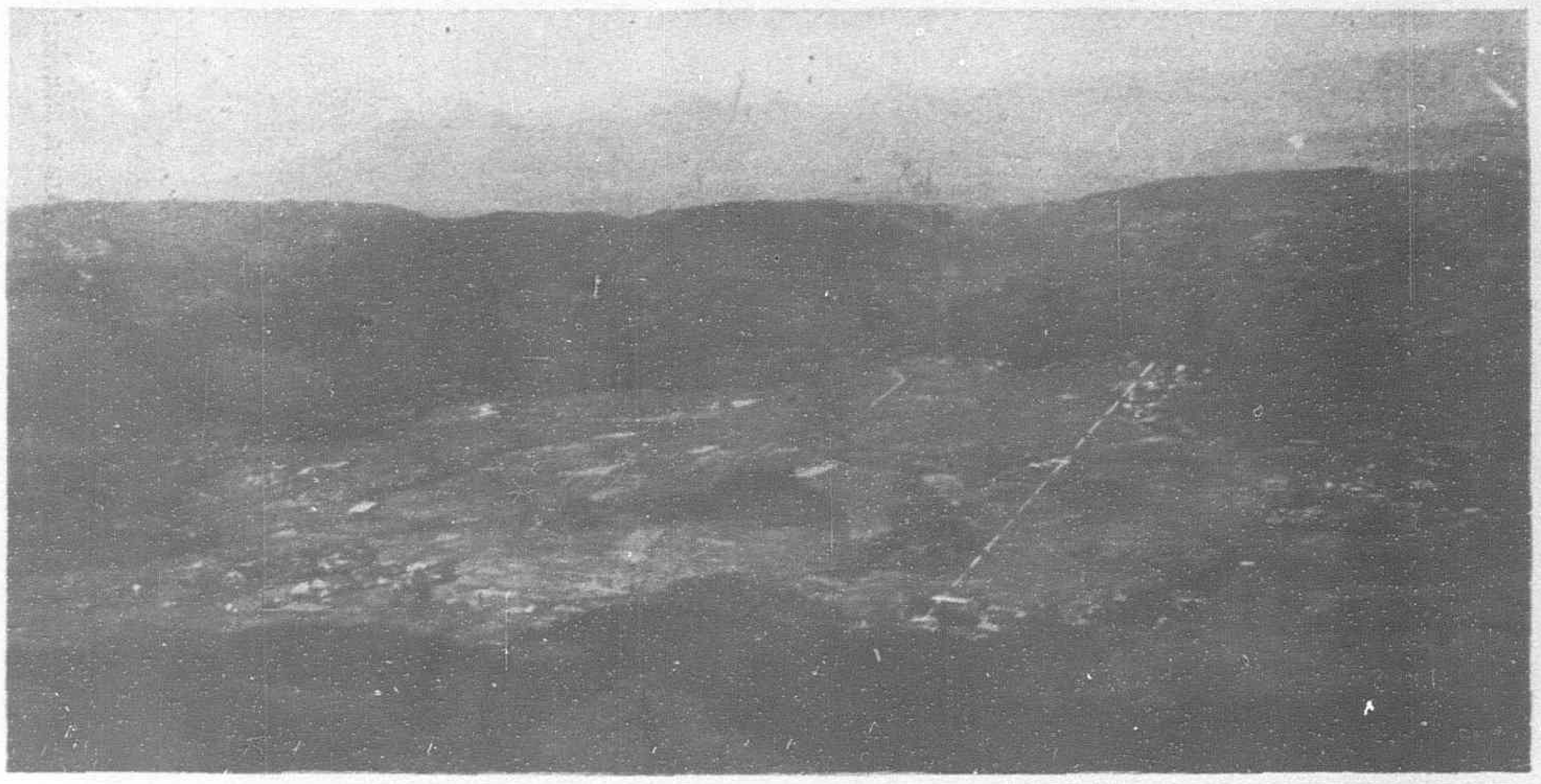
It may be said at the outset that the country through which the Tanna Tunnel is being excavated presents most difficult engineering problems on account of the peculiar geological formations in that region. In general, the formation is mainly agglomerates containing andesite of various kinds. The present Atami Basin on the edge of which the Tunnel is being constructed corresponds to the depressed crater of a volcanic cinder cone of great age. Actual observation inside the tunnel bears out this theory, the tunnel proceeding through the edge of the depression crater and on to the opposite slope where there exists an alternation of lava flow, tuff and agglomerates running from east to west generally. At the middle section of the tunnel the line proceeds under a round depression called the Tanna Basin. Several borings were made from the bottom of the Basin which show that it lies on a long broken line running from east to west and that it corresponds to a kettle depression produced by a group of faults and it is expected that the excavation will encounter many of these features. Of the numerous faulted zones encountered in the work, most of them are filled with soft clay and loose rocks these faulty breccia being sometimes 50 feet thick.

On account of the alternate layers of pervious and impervious ground met with, the excavation has been much retarded by frequent gushing out of water under high pressure as a heading pierces an impervious zone and taps what corresponds to a large underground reservoir of water. This difficulty has been increased on account of water being accompanied by faulted braccia and the large amount of mud and sand which flows out with each new rush of water.

The problem of coping with a thick layer of solfataric clay zone at one section of the Tunnel has not as yet been satisfactorily solved although excavation is proceeding beyond that part of the Tunnel. This clay is easily excavated in the relatively dry condition in which it is first dug out but on opening of a space in the mass allowing water to seep into the clay and expanding it in such a way that it exerts an enormous pressure on any medium which is erected to hold it in place. This solfataric clay is made up of rocks decomposed by the action of hot springs, fumaroles and solfatara through vents in the faults. The geological conditions in

PL.II. Profile of the Tanna tunnel
25614ft
Oct 1929





Depression by Fault at Tanna: The Tunnel is being Driven About 500 Feet Under Dotted Line

the Tunnel district which tend to make excavation difficult may therefore be grouped under three headings, the many faults encountered, great inflow of water and the peculiar solfataric clay.

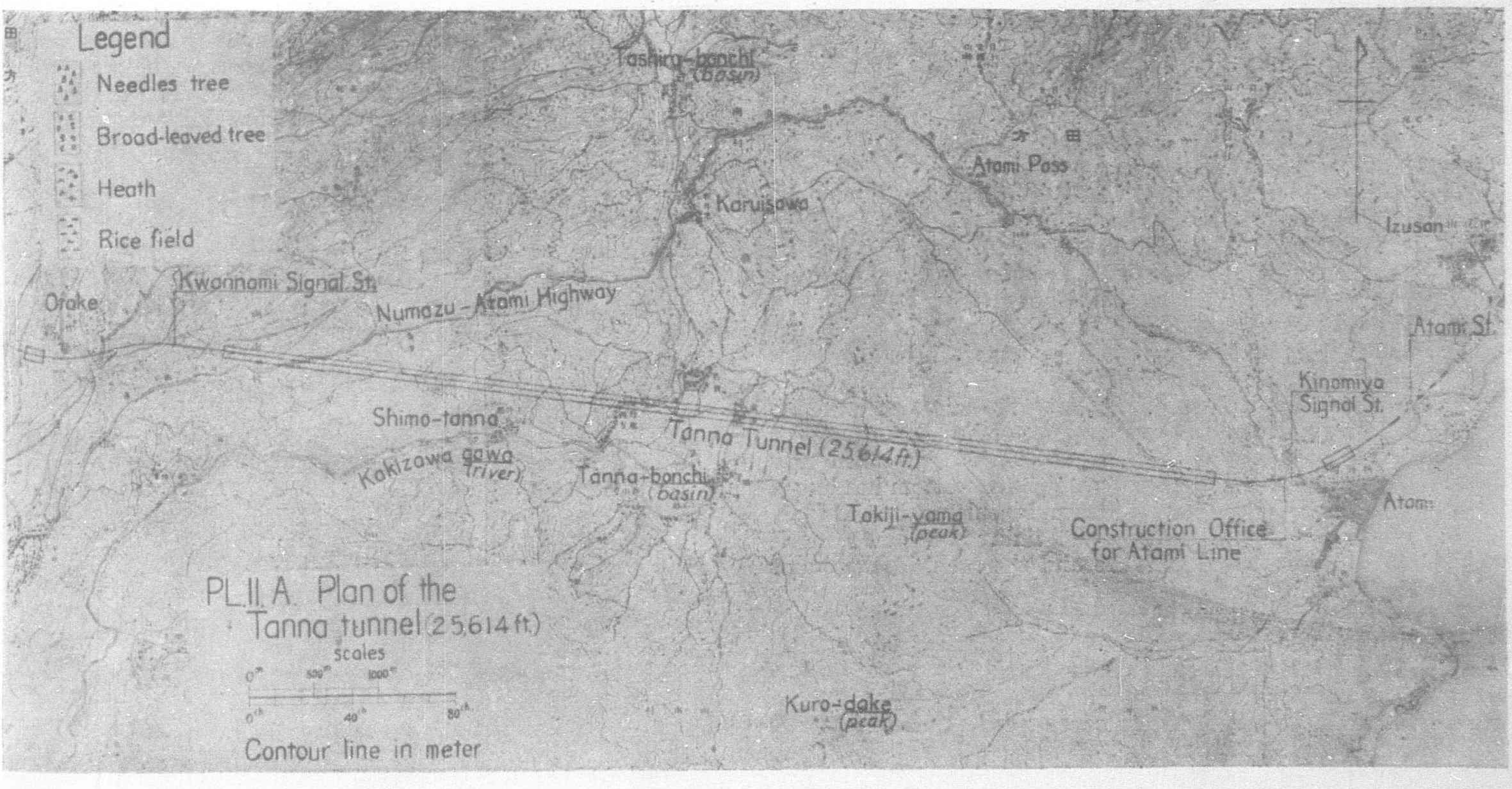
It was finally decided to construct the tunnel at its present site and work actually commenced in June 1918. Excavation was begun from both ends and proceeded smoothly up to February 1922 when the west side heading reached a point 5,000 feet from the entrance and at a later date to 8,000 feet to the east side. Since that time a number of major faults were encountered the friction breccia of which were from 50 to 40 feet in thickness and serious difficulties were met due to enormous earth pressure and the large amount of water under high pressure, all of which retarded the work considerably.

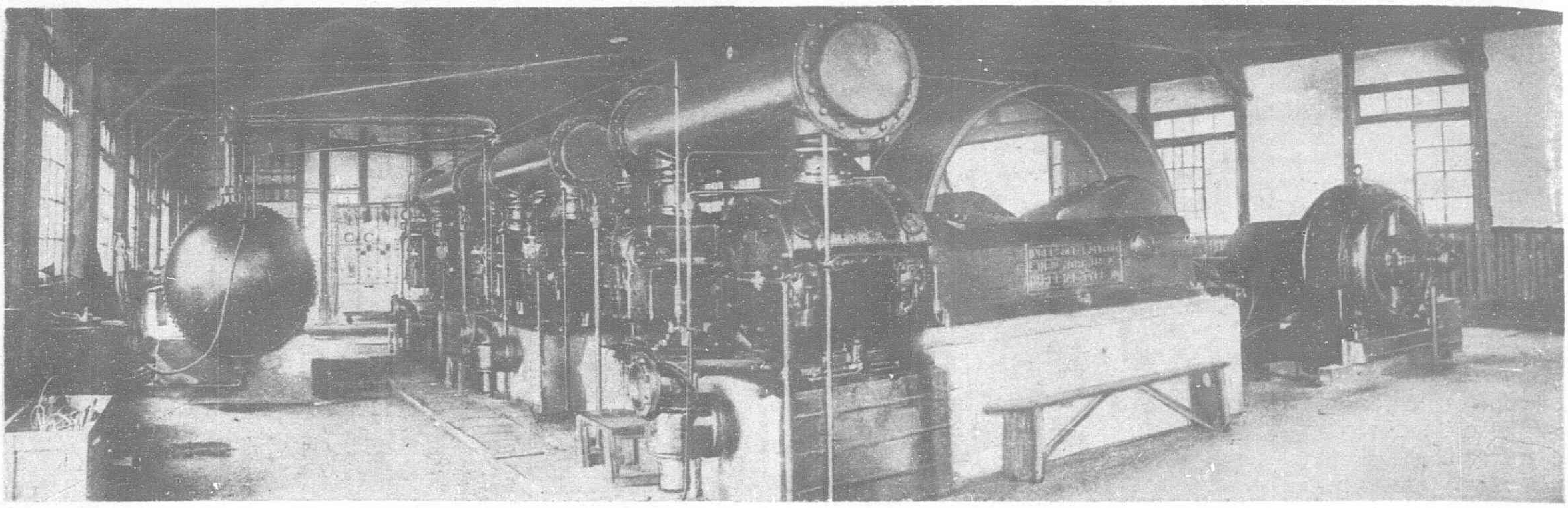
In May 1925 the West heading reached a faulted zone where the maximum water flow reached the world record amount of a 121 cubic feet per second, at which time several thousand cubic yards of mud was forced out burying about 200 feet of the completed tunnel. This was the most serious accident which had occurred to date, but not the first, as in April 1921, 150 feet of timbering at a distance of 980 feet from the East portal collapsed killing 16 men and entombing 17 others, all of whom were rescued seven days later through emergency drifts.

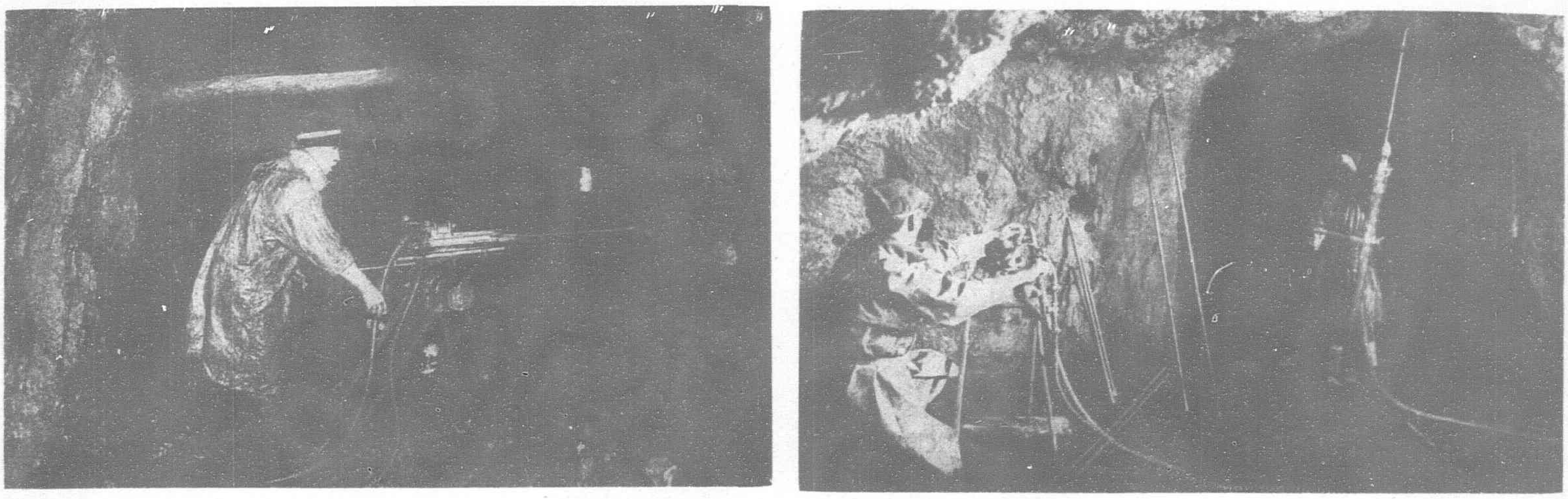
Removal of debris and reconstruction of the damaged section was completed by May 1922. Previous to the accident, the bottom heading had reached a distance of 4,450 feet where it met a faulted zone and work was stopped while the damage was being repaired. Continuing from this point, the heading reached 4,950 feet in September 1922. Work from this point on was extremely difficult due to the large amount of water under heavy pressure encountered. The heading was continued through this zone but in September 1924 this section was inundated by a large volume of water, instantly drowning the 16 workers at the face of the heading. The lining of this difficult section of 60 feet was completed however by October 1926, four years and eight months after the beginning of the excavation in this faulted zone.

It was immediately seen that ordinary methods would not suffice for this work, and plans for coping with the difficulties encountered were made. Following the accident a number of new drain drifts were constructed to care for the large water flow. Drainage tunnels six feet square were completed at both ends of the tunnel for permanent use. The one at the West side being located at a distance of 40 feet from the main tunnel and five feet below the floor level, with a drainage capacity of 150 cubic feet per second.

In the mean time work on the West section was proceeding with similar difficulties. On May 8, 1925, the bottom heading reached 7,083 feet and encountered a large amount of water which reached a maximum rate of 123 cubic feet per second, accompanied by a large quantity of sand which investigation later showed amounted to 5,000 cubic yards. Work was brought to a standstill until the completion of the drainage tunnel and it was a year later before work on the bottom heading was resumed. Until the occurrence of this accident, the heading had proceeded through agglomeratic lava which suddenly changed to soil composed of volcanic lapilli containing a great quantity of water which had been shut in between lava strata and which might be likened to a reservoir under heavy pressure. The past three years have been spent in the excavation of only 1,400 feet through ground of such material. Again on the east side ground decomposed by the action of hot springs and a faulted breccia zone containing water was encountered by the bottom heading at 8,200 feet, investigation showed that this ground covered an extensive area interspersed with faults and water under high pressure as well as a short section of solfatarice clay







Ingersoll-Rand Equipment at Tanna Tunnel

Top: Air Compressor Plant

Leyner Rock Drill **Stope Hammer**

which has given an enormous amount of trouble to the engineers and has even now not been entirely overcome.

The following will be some idea of the general, progress of the work and the difficulties which have been met and overcome during the course of construction up to the present time, to take up the details from the beginning and trace them to the present situation of the work on both the East and West headings.

In general all the tunnels of the Atami line, of which the Tanna Tunnel is the principal one, are double tracks. Fig. 3. shows the corresponding section for a straight line and for curved section, in the drawing of which the car and construction gauges of the Japanese Government Railways are inserted.

The thickness of the tunnel lining varies according to the intensity of earth pressure while the shape also is subject to minor changes in some parts. The minimum thickness of the lining that has so far been completed is 2 feet 4 inches at the crown of the arch and the maximum, 6 feet 3 inches while no portion of the tunnel which has already been excavated has been left unlined.

The fact that no part of the tunnel has been left unlined under the heavy earth pressure with which the engineers in the district of the Tanna Tunnel have to contend is a feature unknown in double track tunnel construction in Europe and the United States.

In regard to the method of excavation the so-called new Austrian method has been adopted by which the bottom heading is first excavated at the proper level followed by enlargement to plan.

As soon as the excavation is finished lining is begun, the side walls being made of poured concrete and the arch with pre-cast concrete blocks.

In exceptional cases it was of course necessary to adopt methods of excavation suitable to the ground encountered but these methods will be discussed later. When the tunnel was first started it was expected that the work would proceed at the rate of 180 feet per month and would be completed in seven years, that is in 1925. It has not been possible to meet this estimation but the tunnel is progressing toward eventual completion within a few years.

In regard to the timbering in the tunnel, green pine logs without bark are generally used for tunnel construction in Japan. The size does not exceed 15 feet in length and 15 inches in diameter, dimensions which have proved satisfactory in regard to weight, cost and other comparisons. In the present case these logs are cut to meet various problems such as props, posts, beams and sills. At the joints cramp and dogirons are mainly used to the exclusion of bolts. Square cut timbers are not employed at any point.

Construction Plant

EAST (ATAMI) SIDE

Air compressors :—
- 3—Horizontal two-stage air compressor for 867 cub. ft./min. at 100 lbs./inch^2
- 1—Horizontal two-stage air compressor for 446 cub. ft./min. at 100 lbs./inch^2

Fans for ventilation :—
- 2—Five-stage horizontal turbo blower for 5,000 cub. ft./min. at 5 lbs./inch^2

Electric locomotives of 2-ft. 6-in. gauge. Trolley wire locomotives:—
- 2—9 tons center cab four wheels El. loc. for 4,000 lbs. tractive force at 7 miles/hr.
- 1—6 tons side cab four wheels El. loc. for 3,500 lbs. tractive force at 6 miles/hr.

Battery locomotives :—
- 2—4 tons side cab four wheels battery loc. for 1,500 lbs. tractive force at 3.5 miles/hr.

Rotary convertors :—
- 2—Three phase 6 pole rotary convertors 100 kW. 50 cycle for A.C. 380 volt and D.C. 600 volt.

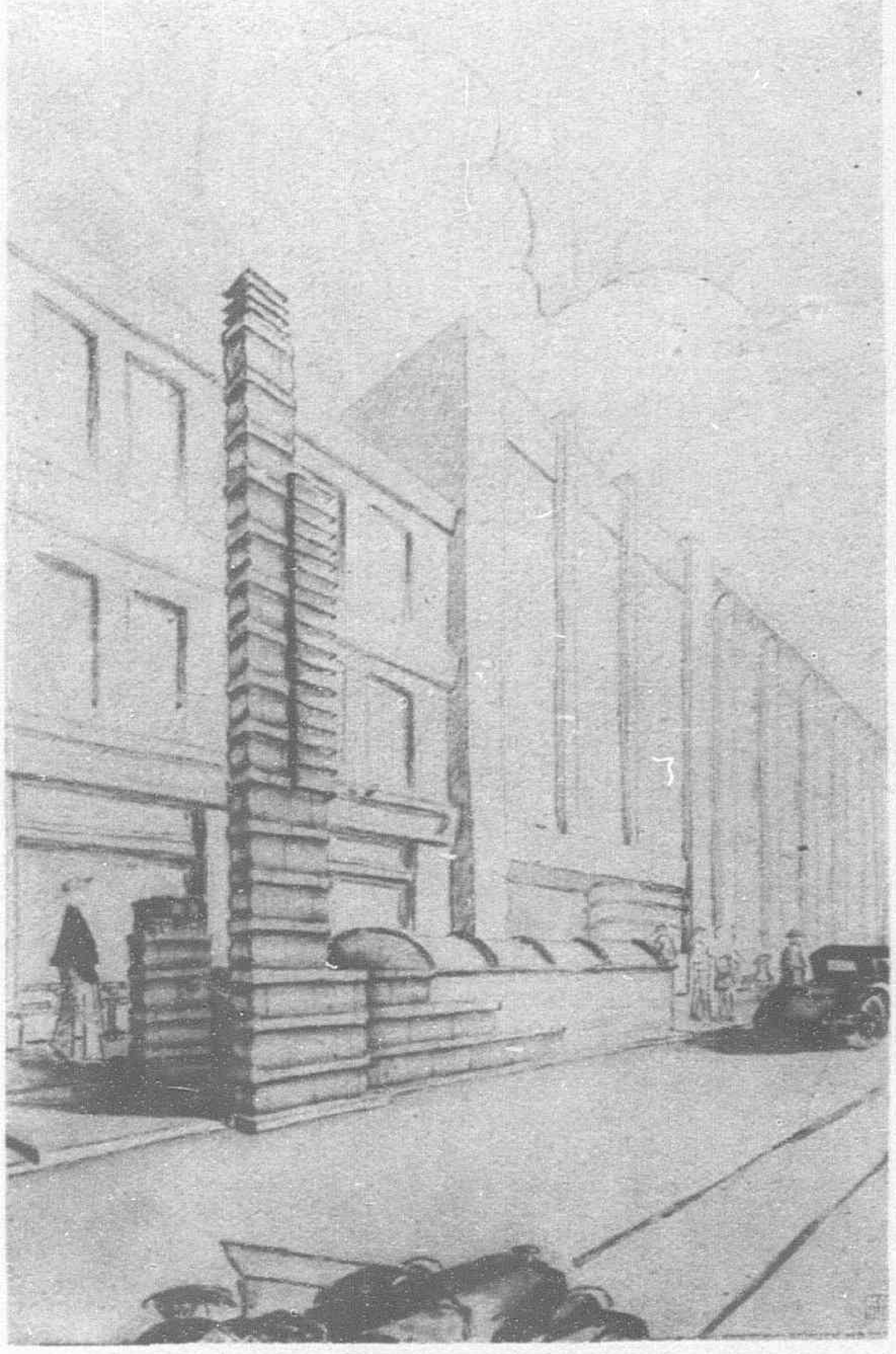
(Continued on page 565).

Proposed Rapid Transit System of Osaka

A Y.160,000,000 Enterprise to be Commenced in 1930

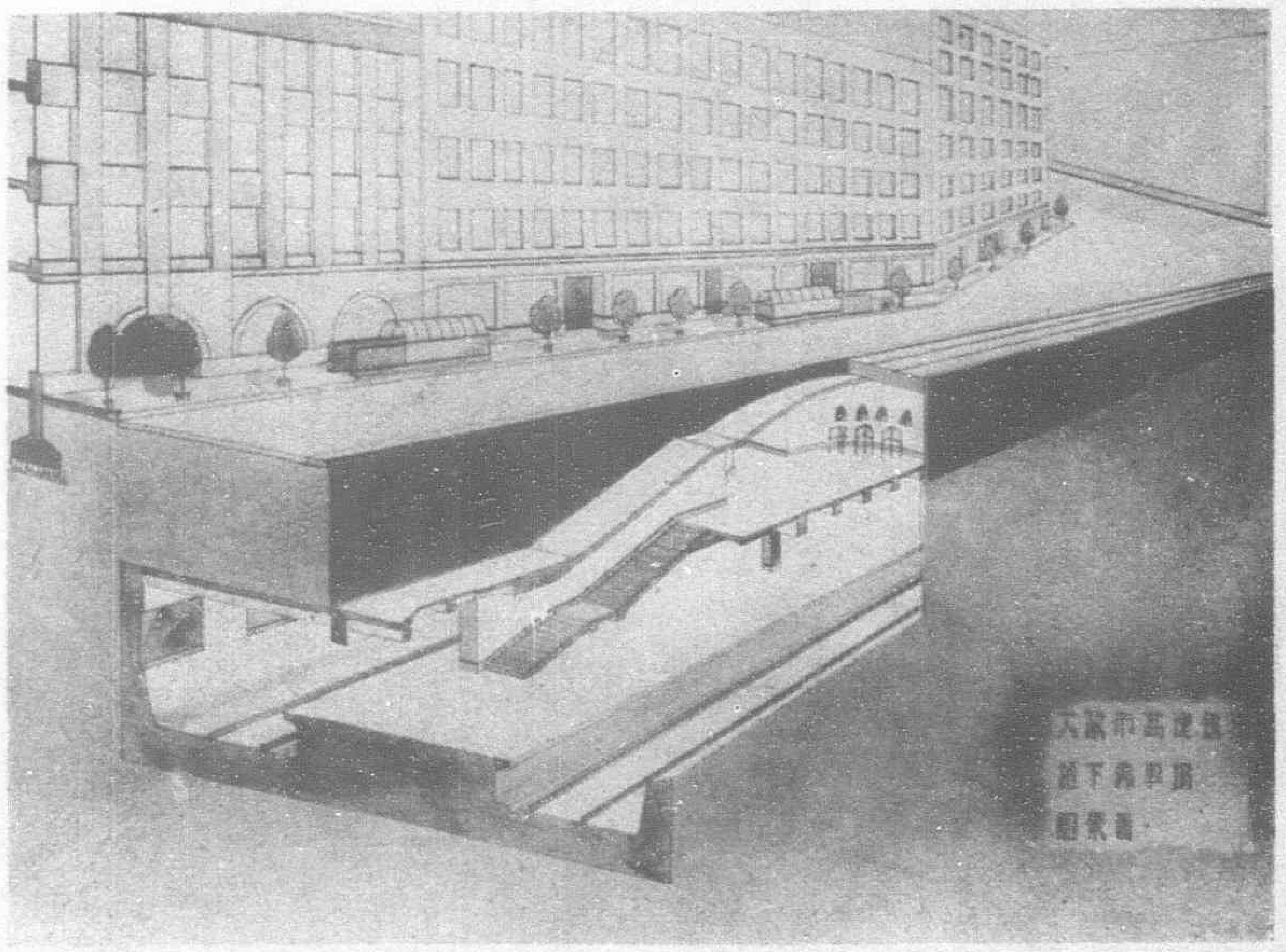
By EISABURO KUSANO

WITH all its present achievements and prosperity, the city of Osaka still has many plans for promoting public utilities before it becomes a wholly modern commercial and industrial metropolis. Provided in its city construction plan are such undertakings as the delineation of the city boundary, the zoning of commercial, industrial, and residential quarters, the creation of a fire-proof area, the improvement of the sewage system, the construction of new roads, and the widening of existing streets. The plan also includes schemes of further facilitating its inter-urban traffic and communications, such as the construction of radiating main highways that lead out of the city in all directions, and the project of building a rapid transit system which will link up, one with the other at the northern and southern centers of the city, all the inter-urban electric railways that connect Osaka with Kyoto in the north, with Nara and Wakayama in the south, and with Kobe in the west. The present article proposes to deal with this rapid transit system of Osaka, the construction of which will shortly be commenced at an estimated budget that runs up to well over Y.160,000,000.



One of the Designs for a Way-side Entrance to Subway Station

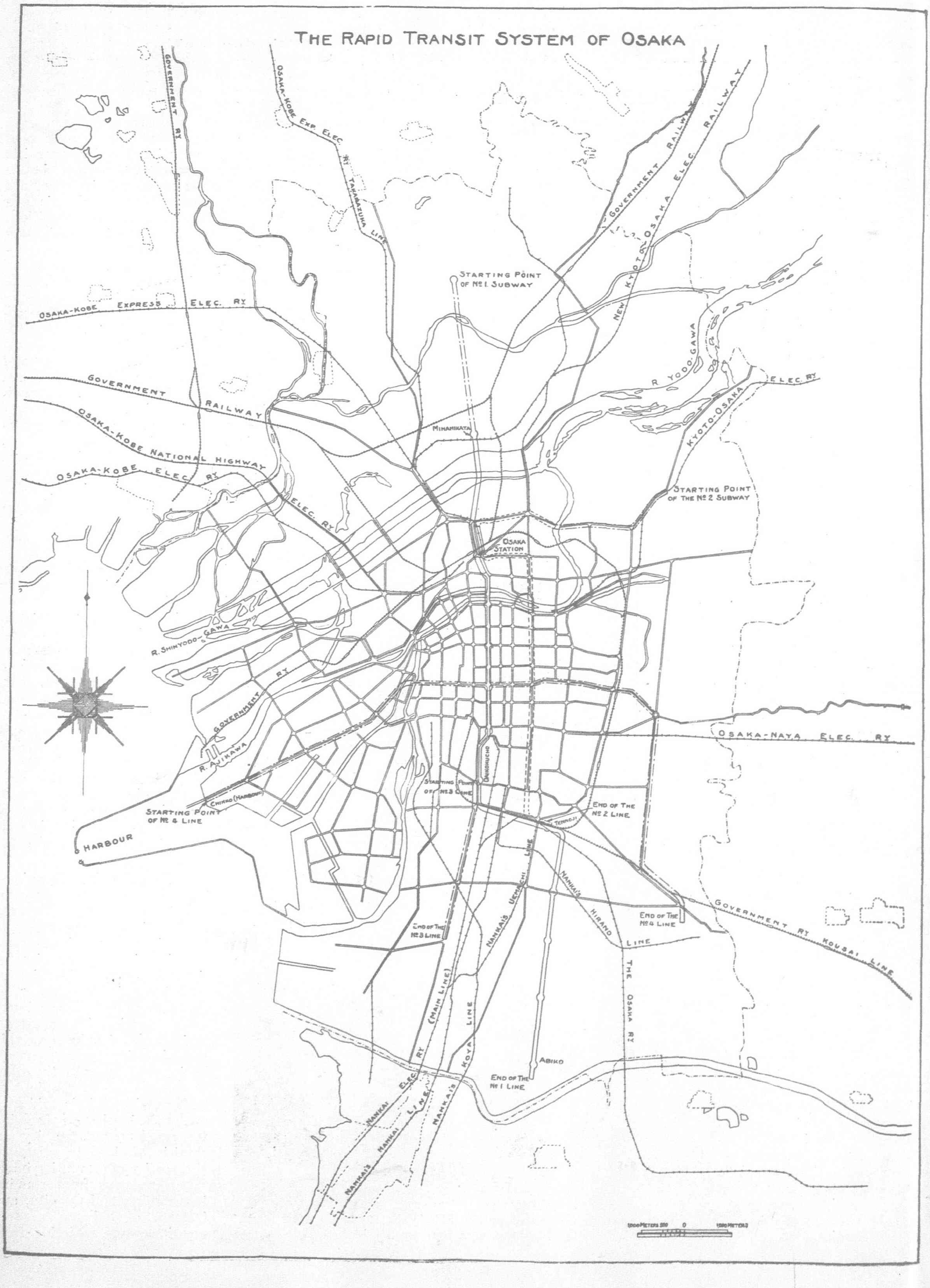
Osaka is an ancient city. Favored by its geographical advantages, it enjoyed the prosperity of being the most thriving commercial port city of the Empire even in the early stage of the mediaeval feudal era. Since the re-establishment of the Imperial régime in the first year of Meiji (1868), it has made further progress not only as a commercial port city but also as an industrial center. The fast and overwhelming development of this city has naturally resulted in a remarkable increase of the population. The Municipal authorities, however, has no established policy to cope with the situation, and the subsequent absence of adequate administrative measures to deal with problems arising from the foregoing amazing commercial and industrial achievements have resulted in the present unnatural expansion of the city. The city authorities who were thus accustomed to the easiness of their laissez-faire policy and who had no plan as to what course of progress the city should take, however, are now awakened to the situation; they are at once eager not only to improve the present deplorable state of affairs systematically but also intend to re-create it into a sanitary, civilized, cultured, and even artistic metropolis where one would love to reside and work. Hence the drafting of extensive city construction plan.



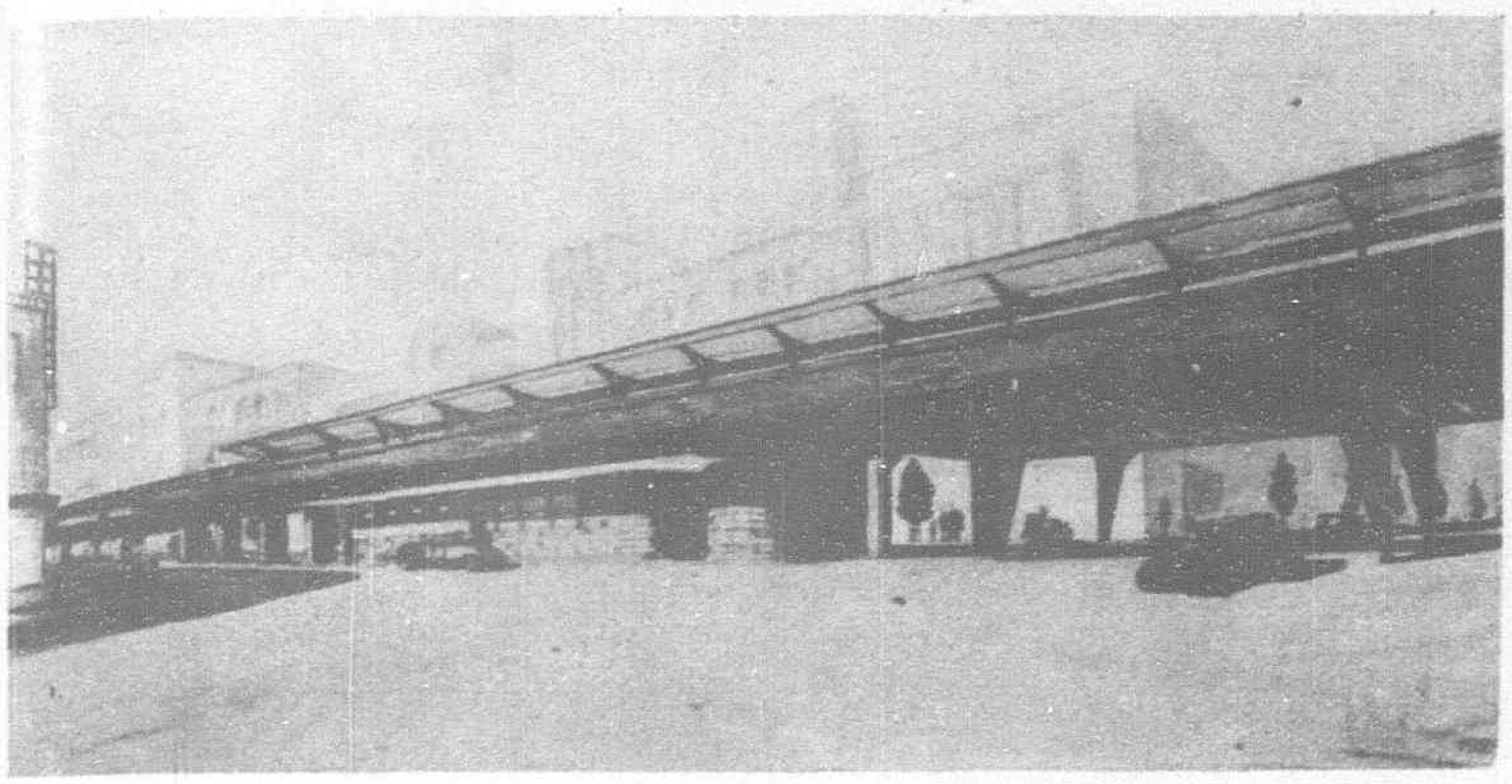
Two Way-side Entrances on the Side-Walk, Mazanine Hall, and the Platform of a Subway Station

Admitting that the city has expanded without order or consistency, one cannot overlook the fact that the inter-urban electric railways radiating from Osaka have made a relatively smooth progress. Between Osaka and Kobe, there are three electric railways, namely, the Osaka-Kobe Electric Railway, the Osaka-Kobe *Express* Electric Railway, the Osaka-Kobe National Highway Electric Railway, in addition to the quadruple track of the Government Steam Railway. Between Osaka and the ancient capital of Kyoto, there run two lines, namely, the Kyoto-Osaka Electric Railway and the New Kyoto-Osaka Electric Railway. Between Osaka and Nara runs the Osaka Electric Tramway, while between Osaka and Wakayama runs the Southern Sea (Nankai) Electric Railway. In addition to the foregoing, there are a number of other electric railways though their operated mileage is rather short, such as the Hanwa Electric Railway, the Osaka Railway, and the Hankai Electric Railway, all of which are being steadily extended. These electric railways have their branch lines, and moreover, additional electric railways are now being projected. When all of these operating and projected electric railways within and around the city of Osaka are taken into consideration, it will be found that the city is situated at the center of a fine cob-web of highly developed local electric railways. And yet, the present means of traffic within the city is in a deplorable stage of development, characterized by disorder and congestion. Travel by trams or by motor-busses in Osaka is an experience of immeasurable inconvenience and discomfort due to lack of smooth means of traffic in the city. In the circumstances, the construction of a rapid transit system in the city, especially one connecting all the foregoing inter-urban electric railways, has become indispensable.

When the plan of readjusting the means of traffic within the city was contemplated for the first time some years ago, it was said that the inter-urban electric railway companies insisted that a central station be established in the center of Osaka, and that all the inter-urban electric railways extend their Osaka terminals to this central station so that they will be linked up one with the other at one place. In the light of traffic policy, this is evidently one of the ideal ways of solving the problem, but the city authorities decided to adhere to their policy of preventing inter-urban railways from running into the heart of the city, and instead, of building a rapid transit system radiating from



THE RAPID TRANSIT SYSTEM OF OSAKA



A Way Station of the Elevated Line, Showing a Train Arriving at the Station and Giving a General Idea of the Construction of the Station as well as the Elevated Line

the center of the city to its outskirts. With the completion of this rapid transit system, residents of the city as well as casual travellers will no longer experience inconvenience, and moreover, all the transit systems within and around the city will be unified.

Rapid Transit System of Osaka

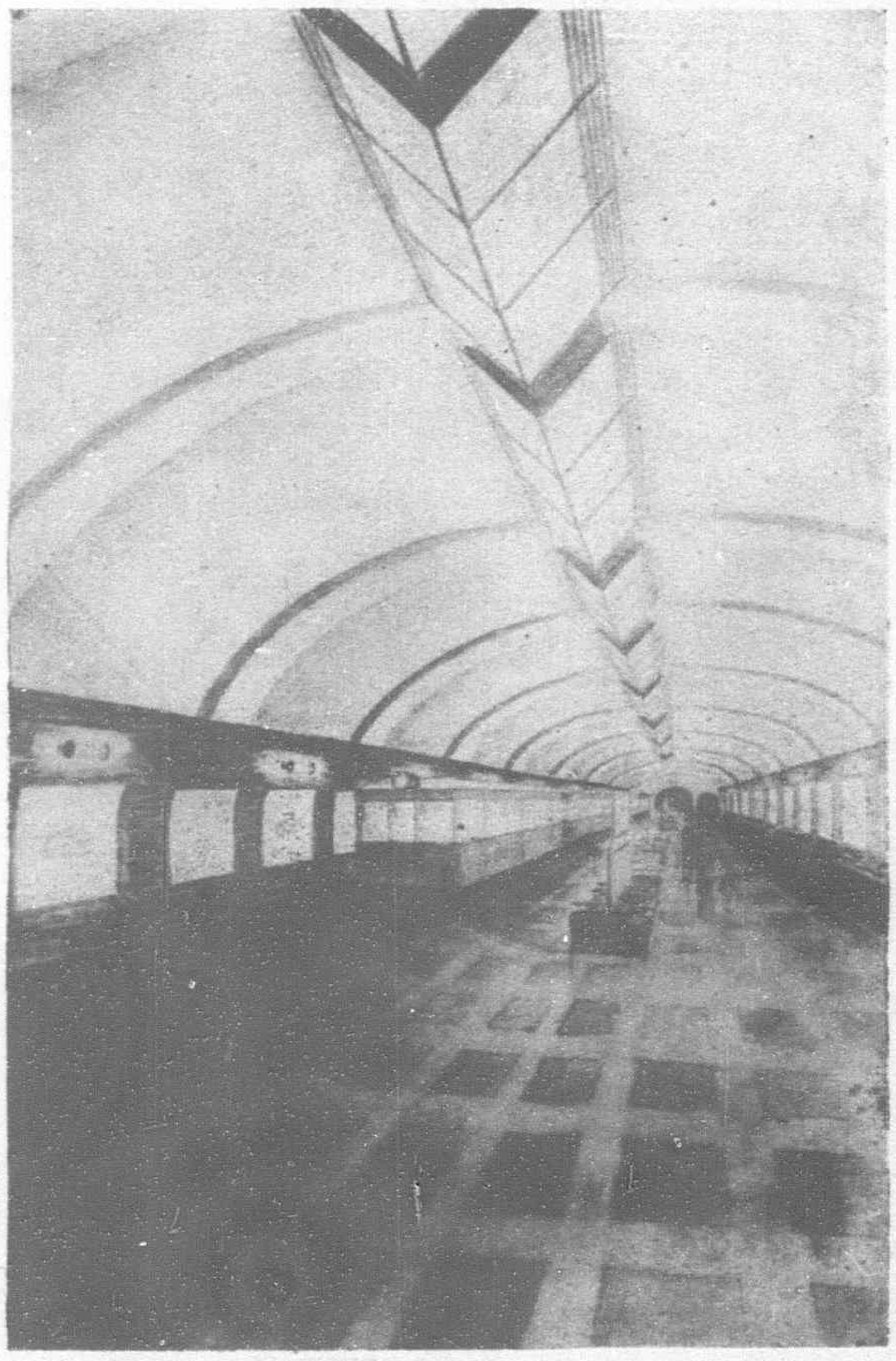
The plan of the rapid transit system of Osaka, which proposes to build both underground and elevated electric railways, was drafted as part of the city construction plan, and was published in the *Official Gazette* of March 29, 1926, in the name Mr. Reijiro Wakatsuki, then the Prime Minister. The Osaka Municipality, at its session of March 27, of the same year, passed the bill authorizing this system, and subsequently, the Municipality applied to the Imperial Government for the license to build and operate the system. The license was granted by the Railway Minister and the Home Minister on June 4, 1927, on condition that the Municipality applies to the Imperial Government before June 4, 1930, for another license to start the construction work and commence the work subsequently in accordance with the Article 5 of the Tramway Act.

The proposed rapid transit system of Osaka is made up of four lines, extending to 33.87 miles in the aggregate total of length.

Line No. 1 starts at Enokizaka, Toyotsu-mura, Toyono-gun, Osaka Prefecture, and ends at Abikomachi, Sumiyoshi-ku, Osaka city, *via* the Osaka Station of the Imperial Government Railway, the Midosuji highway, the Namba Station of the Nankai Electric Railway, the Daikokucho crossing of the city tramway, the Tennoji Station of the Kansai line of the Imperial Government Railway, and Nishi-Tanabemachi, Sumiyoshi-ku, Osaka city. The total mileage is about 12.4 miles.

Line No. 2 begins at the southern end of Morishojimachi, Higashinari-ku, Osaka city, and ends at the Tennoji Station of the Kansai line of the Imperial Government Railway, *via* the Osaka terminal of the New Kyoto-Osaka Electric Railway at Tenjinbashi-Rokuchome, along the North Osaka line of the Osaka-Kobe Electric Railway, the Osaka Station of the Government Railway, Ogibashi, southern end of the Tenji-bashi (bridge), and Matsuya-machi. The mileage, 8.52 miles.

Line No. 3 opens at the Daikokucho crossing of the city tramway and ends at the southern end of Tamademachi, Nishinari-ku, Osaka city, *via* Namba-Sumiyoshi highway of the city construction plan. The mileage, 2.31 miles.



A Typical View of a Subway Station, Showing An Island Form Platform and the Lighting

Line No. 4 commences at the eastern side of the main pier of Osaka Harbor and winds up at Hirano Nishiwakimachi, Sumiyoshi-ku, Osaka city, *via* the Hanazonobashi car-stop of the Harbor line of the city tramway, along the Nagahori highway of the city construction plan, Imabayashimachi, Sumiyoshi-ku, and the western end of the Hirano station of the Kansai line of the Government Railway. The mileage, 10.63 miles.

In view of the fact that this is a very extensive building program and that the financing, the building ability, and other minor factors make it difficult to commence all the construction work at one and the same time, it will be divided into three parts. Subsequently, it has been decided that the work should be started with the No. 1 line between Minamikata and Abiko, because the volume of traffic in the districts that this line runs along is the heaviest of all, and also as the work on this line could be carried on side by side with other undertakings of the city construction plan.

It was feared in some quarters that the construction of the rapid transit system might have to be postponed indefinitely in the face of the extreme financial retrenchment policy of the present Hamaguchi Ministry. The city authorities, in charge, however, believe that they will be able to begin the work some time in the early part of 1930 when the present reconstruction work of the Osaka Station of the Government Railway will reach such a stage where the work of the No. 1 line of the rapid transit system, which is planned to go across the station underground, must be carried out simultaneous with the station's reconstruction work.

First Phase of Work

The first phase of work is scheduled to be completed during four years, spending nearly Y.77,200,000, it consisting of the following:

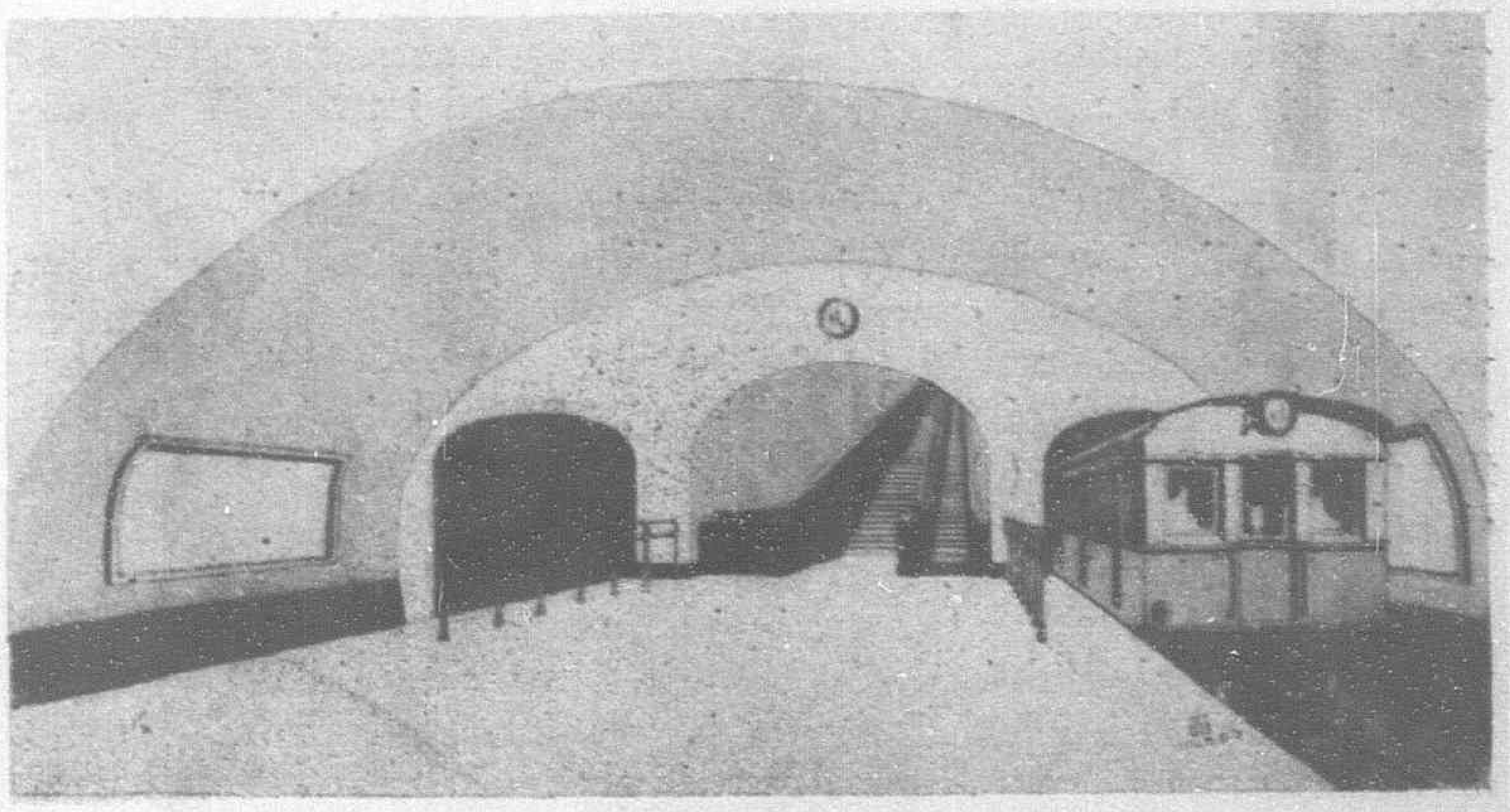
(*1*) No. 1 line, between Minamikata and Abiko, a distance of 10.09 miles.

(*2*) No. 2 line, between Shibatamachi and the Osaka Station of the Government Railway, a distance of 0.7 mile; of the same line, between the southern end of the Tennoji Park and the Tennoji terminal of the line. (These parts runs side by side with the No. 1 line in quadruple tracks, and therefore, the work could not be carried out separately).

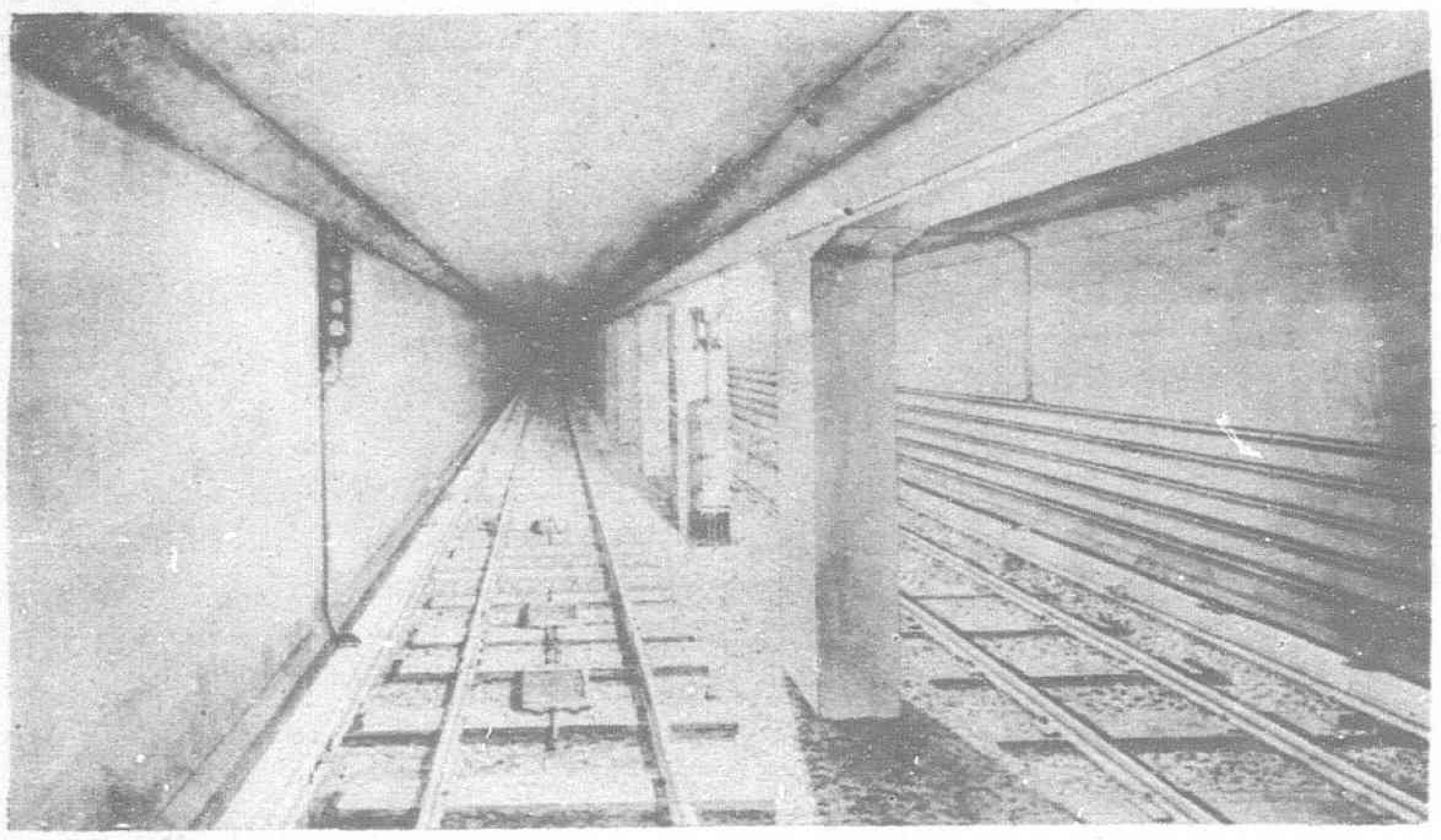
(*3*) No. 3 line, between the starting point of Daikokucho and the south of the Kansai line of the Government Railway, a distance of 0.56 mile, which also runs along No. 1 line in quadruple tracks.

According to the original construction plan, the disbursements are to be made as follows:

First year (1929-30): Y.16,860,575, including Y.150,000 reserves.



A Subway Station Showing Escalator



Three Position Automatic Bloc Signalling with Overlap Section

Second year (1930-31): Y.19,815,037, including Y.150,000 reserves.

Third year (1931-32): Y.19,314,582, including Y.150,000 reserves.

Fourth year (1932-33): Y.21,191,882, including Y.130,000 reserves.

Total Y.77,182,076

Of the foregoing total, Y.63,257,490 is going to be obtained by the bond issuance and Y.11,052,110 is going to be shouldered by those who are directly benefitted by the construction of this system, the rest of disbursements being made from miscellaneous income.

Underground Railway

No. 1 line of this system goes underground at the point where it crosses the elevated freight line of the Government Railway on the southern side of the Shin-Yodo-gawa (river) and all the way through the old city of Osaka. After it crosses the trunk line of the Kansai line of the Government Railway near Tennoji, it becomes elevated. The Tennoji station and its neighborhood are going to be subway construction.

In accordance with the geographical conditions, the measurement and structure form of the subway slightly differ from one part to another, but generally speaking, the depth of the subway track from the surface of the road is going to be from 30 feet to 40 feet, and the measurements are as follows :

Shallow subway (underneath street): rectangular form reinforced concrete, effective breadth being about 28 feet, and height, about 16 feet.

Deep subway (underneath river-beds): rectangular form reinforced concrete, effective breadth being about 27.5 feet, and height, about 16 feet.

The work will be carried out in open cut after strong sheet piling is built so that neighboring buildings may sustain no damages, but at such places as between Umeda (the Osaka Station) and Oe-bashi (bridge), and between Motomachi Sanchome and Daikokucho, the subway work will be conducted underneath strong planking in order that the traffic will on the broad highway above may not be disturbed. In other parts of the city, the buildings on the surface of the line are to be removed as soon as the land required is purchased, and the work be started immediately afterwards.

It is expected that the subway construction work will be carried out in the following order : (*a*) sheet piling, (*b*) digging, (*c*) construction of the reinforced concrete frame work and water prevention work, (*d*) concrete work, (*e*) finishing touch, re-burying of open space, and removal of the sheet piling, (*f*) track laying and cable fixtures installation, (*g*) installation of cable, telephone line, and signals.

Of the foregoing order of work, from (*a*) to (*e*) is going to be carried out at one and the same time, and therefore, the distance where the actual work is conducted will reach a considerable length, somewhere about 1,500 feet. It is expected, however, that the distance where the work goes on will not be prolonged any more than necessary and as the work is completed, the surface is to be finished in accordance with the regulations of the city construction plan.

Elevated Railway

It is expected that both ends of No. 1 line of the rapid transit system of Osaka are to be elevated, that is, north of the elevated freight line of the Government Railway at the south of the Shin-Yodo-gawa (river), and south of the Kansai line of the Government Railway. The structure of the elevated line will have a single iron framed reinforced concrete pier all the way through, spreading at the top like an umbrella. The height of the track on the elevated line and the surface of the street will be about 22.4 feet and the breadth at the top will be about 33 feet.

It is expected that the elevated structure will be built in accordance with the following order : (*a*) digging of the foundation of the pier. (*b*) concrete work of the foundation of pier and the construction of the iron frame. (*c*) concrete work of the pier and finishing. (*d*) the track laying and cable fixtures installation. (*e*) installation of cable, telephone line and signals.

While this work goes on, the traffic in the centre of the street (for about 33 feet wide and about 1,000 feet long) will be suspended. Neverthless, it is expected that the relationship between the elevated system construction and the traffic on the street below will be a simple one, that is, the work may not cause much trouble, as the elevated structure on the No. 1 line of the rapid transit system of Osaka is to be built on a street which will be newly opened in accordance with the city construction plan.

Subway Stations

Seven subway stations are going to be built on the No. 1 line at Umeda, Yodoyabashi, Honmachi, Shinsaibashi, Namba, Daikokucho, and Tennoji. Of these stations, the construction of those at Umeda, Daikokucho, and Tennoji is going to be somewhat complicated as they are located at juncture of two lines. It is planned, however, that the passengers of the different lines going in the same direction leave or take the train at the same platform by means of arranging the rails in such a manner ; the platform is going to be built in the island form, that is, to have the rails on both sides of the platform.

At the Umeda station, the No. 2 line runs in parallel with the No. 1 line for a short distance, and joins at the station. The station, therefore, will have quadruple tracks and two island form platforms. The traffic facilities of this station will be highly developed so that many passengers may avail themselves of this system smoothly. At the Daikokucho station, the No. 3 line begins, and therefore, the station is going have the equipment of running a through traffic from the No. 1 line on to the No. 3 line, as well as that of a terminal of the No. 3 line. The station, however, will have only one island form platform, and three tracks. The Tennoji station connects the No. 1 and the No. 2 lines, and therefore, it will have the equipment of running a through-traffic from No. 1 to No. 2 line as well as that of a terminal of the No. 2 line. It will have quadruple tracks and two island form platforms.

When coming down to a subway station, the passengers go down to mezzanine hall from the entrances to be built on both sides of street above, and then go down to the station platform from this mezzanine hall where the tickets are obtainable. Some of the sub-stations will be equipped with either elevator or escalator from the mezzanine to the platform ; so far it is planned that the Yodoyabashi and the Shinsaibashi stations, which are on the level with the river-beds of the Tosabori-gawa and the Nagahori-gawa respectively, will be equipped with this facility.

Subway Platforms

The subway platforms will have a sufficient length to accommodate trains consisting of 12 carriages, about 720 feet long, but for the time being, one half the length of them will be built to begin with. The island form platforms will have a width of about 24 feet, but that of the Umeda station alone will have a width of 25 feet.

Subway Entrances

The width of subway entrances will differ in accordance with that of the side-walks of the street, but it is going to vary from 6 feet to 9 feet wide. Each subway station will have four entrances, two each on both sides of the street. The city authorities have various designs for these entrances to attract the attention of passers-by as well as to match the surrounding scenery.

Connection with other Lines

At the Umeda station, it is expected that the subway station will be linked up with the Osaka station of the Government Railway, as well as the Osaka terminals of the Hanshin (the Osaka-Kobe Electric Railway) Hankyu (the Osaka-Kobe Express Electric Railway) and the Shin-Keihan (the New Kyoto-Osaka Electric Railway) stations by underground paths. Moreover, these underground paths will also lead to safety zones of the city tramway and also to side walks of the street at various places.

At the Namba station, the subway will be connected with the Nankai (the Southern Sea Railway, its main line running between Osaka and Wakayama) line by an underground path.

Nothing definite is so far drafted as the method of reaching the Government Railway station at Tennoji, the Osaka terminals of the Osaka Railway and the Hanway Railway from the Tennoji station of the present rapid transit system.

Elevated Stations

Six elevated stations will be built on the No. 1 line, at Minamikata, Minami-Kasumicho, Abeno, Nishi-Tanabe, Nagaori, and Abiko. They are going to be simple way-stations, standing on three piers each; between these piers of the elevated stations, tramcars on the street below are to pass through. Each one of these stations will have four entrances, two each on both sides of the street on the side-walk, they leading up to the station above by steps. The stations will all glass-covered sheds, the width of which extends to about 48 feet.

The platforms will have sufficient length to trains consisting of 12 carriages, about 720 feet long, but as in the case of the subway stations, only one half the length of them will be built to begin with.

In consideration of the fact that the construction of these elevated stations necessarily narrows down the street below, cutting the width of the drive-way in the center by 42 feet because of the three piers, it is planned that the width of the street below be extended from 100 feet to 120 feet at places where the stations are going to be built.

Rails, Signals, and The Third Rail System

The rapid transit system of Osaka will have 100 lb. T shape rail all the way through, laid on a gravel bed. It is expected that the sleepers will be larger than the usual, and they will be fastened to each other by iron sheets that runs zig-zag over the sleepers. As for the signals, what is called three position automatic block signalling with overlap section is going to be adopted. Instead of the trolley system which is popular all over the country, the third rail system is going to be used in this line.

Transformer Stations

It is proposed to build two power transformer stations in the northern and southern parts of the city to begin with, but another one will be built somewhere in the center of the city. The power will be direct current, 600 volts, transmitted by the municipal switchboard station.

Carriages

The city authorities plan to run electric trains made up of three carriages for the time being, and they are going to build 65 carriages to begin with in addition to two freight cars. All of them will be an all-steel car, it having a length of 57 feet and a width of 9.5 feet; it will have three entrances, with automatic doors, and it will also have telephone and loud-speakers. Each one of these cars will accommodate 120 passengers.

A car shed and a factory will be established in the neighborhood of the Abiko terminal of the No. 1 line, and the car-shed will accommodate 100 carriages.

The Tanna Tunnel

(Continued from page 560).

WEST (OTAKE) SIDE

3—Horizontal two stage air compressor for 867 cub. ft./min. at 100 lbs./inch^2
3—Rotary low pressure single-stage air compressor for 1,270 cub. ft./min. at 50 lbs./inch^2
2—Horizontal extra heavy type gas exhausted for 5,000 cub. ft./min. at 1.5 lbs./inch^2
2—9 tons center cab four wheels El. loc. for 4,000 lbs. tractive force at 7 miles/hr.
1—6 tons side cab four wheels El. loc. for 3,500 lbs. tractive force at 6 miles/hr.
1—6 tons side cab four wheels El. loc. for 1,000 lbs. tractive force at 7 miles/hr.
2—4 tons side cab four wheels battery loc. for 1,500 lbs. tractive force at 3.5 miles/hr.
2—Three phase 6 pole rotary convertors 100 kW. 50 cycle for A.C. 380 volt and D.C. 600 volt.

Repair shops :—

2—8-ft. English pattern engine lathe
1—4-ft. ,, ,, ,, ,,
1—20 inch drilling machine
1—22 inch plain milling machine
1—24 inch back geared shaping machine
1—$\frac{1}{4}$-$1\frac{1}{4}$ inch bolt screwing machine, etc.

Otake steam power plant Output :—3,000 k.v.a.

Steam boilers :—

4—400 h.p. water tube boiler with superheater for 190 lbs./inch^2 by gauge.

Steam turbine :—

1— Horizontal 400 h.p. Parsons Reaction turbine speed at 3,000 R.P.M.
2—8-ft. English pattern engine lathe
1—6-ft. ,, ,, ,, ,,
1—4-ft. ,, ,, ,, ,,
1—20 inch drilling machine
1—22 inch milling machine
1—24 inch back geared shaping machine
1—$\frac{1}{4}$-$1\frac{1}{4}$ inch bolt screwing machine, etc.

The installation of these plants and equipments was completed in August, 1919, except the low-pressure compressors and hospital lock for the compressed-air excavation. The air compressors were at first driven by steam power, which, however, was changed to electric power with the completion of the transmission equipment. A isolated generating plant was installed at the west end of the tunnel, as there was no private company to supply electric power, but, afterwards, the power-supply was obtainable from private concerns at a lower cost. Accordingly, the isolated generating plant established was not used, and it is operated only when the power supply from two different sources is required for the safety of the tunnel work.

B.T-H. Turbo-Alternators for Hongkong

The China Light & Power Co., Kowloon, have ordered through Inniss & Riddle (China), Ltd., two 5,000 k.W. B.T-H. Turbo-generating plants which will be built at the Rugby works of the British Thomson-Houston Company.

The China Light & Power Company have decided to change their system from the present 60 cycles to 50 cycles as at Hongkong and this contract is the first step in that direction.

During the year large B.T-H. turbo-generating plants have also been ordered or installed at Hongkong, Tsingtao, Nanking and Nanchang.

A repeat order has just been received for the electrical equipment for five of the Shanghai Municipal sewerage underground pumping stations and an order for a 650 horse power synchronous motor equipment for the Shanghai Waterworks.

The Kwangtung River System

Mr. G. W. Olivecrona, the Engineer-in-Chief of the Kwangtung Conservancy Board, has presented a report of the greatest importance to the province of Kwangtung and the City of Canton. He pointed out that millions of dollars are lost every year in the province owing to flood damage, and, moreover, that the approaches to Canton are silting up to such an alarming extent that the City will in the not far distant future cease to be a port at all and that the present complaints of ship-owners about pilotage difficulties will be followed by a withdrawal of their vessels.

A big scheme of river control is outlined as follows—the estimated cost being $35,000,000.

The memorandum includes a general scheme for the improvement of the flood protective works along the West, North, and East Rivers, and has been adopted by the Board of Conservancy Works of Kwangtung. It states :—

The Kwang Province is drained by three main rivers, Si Kiang, or West River ; Pei Kiang, or North River ; and Tung Kiang, or East River.

In order to protect the plains, through which these rivers flow, from being inundated by the yearly summerfloods, the inhabitants have confined the river-beds within embankments (dykes). These embankments follow the main rivers as well as the tributaries and branch channels, and form an intricate system of enclosures all over the plains. Each enclosure forms a unit for itself, and the farmers, living within, are only responsible for the maintenance of the dykes of that unit. No organization for supervising the maintenance of the dyke system as a whole exists. The result is that some dykes are well kept up but others in a deplorable condition.

The direct losses, sustained by the population during the last ten years, on account of inadequate flood protection, amount to tens of millions of dollars ; and scarcely a year passes without one or more districts being flooded. The repeated flood calamities, naturally, retard the development of the rural districts, and improvements, which otherwise willingly would be undertaken by the peasants, are not thought worth while introducing.

The Board of Conservancy Works, constituted on December 13, 1914, by power of a Presidential Mandate, have made comprehensive investigations with regard to the flood problem, and the Engineer-in-Chief to the Board, who has made these investigations, has arrived at the following conclusion with regard to the means which should be applied in order to protect the land from being flooded.

Protection against inundation of the river valleys and the Delta cannot be sought by lowering the high waterlevel, as this would not be justified from either an economical or a technical point of view.

The object can, however, be attached by confining the floods within the limit of the present dyke-system, provided these are partly reconstructed, generally improved and properly maintained to a sufficient elevation, and by concentrating the flow in a few main outlet channels.

After the individual dyke systems are reconstructed, the supervisory powers should be withdrawn from the local dyke committees and entrusted to a central supervising organization, acting on behalf of the Government. The Engineer-in-Chief proposes the work to be carried out as mentioned hereafter.

The present dyke system along the main rivers should be strengthened by substantial earthfill, and protected, on the river side, against scouring. Their height should be increased to a level reaching at least three feet above the expected highest water level. The highest waterlevel shall be determined with the assumption that the river carries its total maximum discharge between the embankments. Where no dykes exist, new ones should be constructed. Creeks and channels, now breaking off the continuity in the dyke systems, should be closed, the smaller ones by ordinary flood gates, permanently shut during flood times, the larger ones by movable dams, which will permit the regulation of flow in these channels. By thus confining the floods to the main rivers, an immense length of dykes, which now border the innumerable branch channels, will be superfluous. The length of dykes which must be reconstructed amounts roughly to the following :—

The West River	445 km. (772 *li*).
The North River	323 km. (560 *li*).
The East River	110 km. (191 *li*).

Sluices Needed

In order to regulate the flow, in branch channels, control sluices should be constructed in the Lupao Creek (already completed), Sainam Creek, and Fatshan Creek. For drainage of the fields a number of drainage pipes will have to be constructed.

In some instances it will be necessary to widen the river bed in order to facilitate the discharges at flood time. The widening will be made either by moving the dykes further inland, thus increasing the high water section, or by cutting away parts of the river bank.

The cost of bringing about an effective flood protection in the three rivers has been estimated as follows :—

WEST RIVER	
Dykes and flood gates..	$11,569,000
Widening of river bed..	6,000,000
Administration and supervision	2,131,000
	$19,500,000
NORTH RIVER	
Dykes, flood gates and regulation dams ..	$8,650,000
Purchase of land	717,900
Administration and supervision	967,000
Miscellaneous work	565,000
	10,900,000
EAST RIVER	
Dykes and flood gates..	4,600,000
Total cost for controlling the three rivers	$35,000,000

By applying labor saving modern machinery on a big scale it may still be possible to keep the cost figures within the estimated limits.

The silting of the Back Reach, especially at Taimei and Taishek shoal, is now such, that the access to Canton Harbor by ships of ordinary coasting type is seriously impeded. At the dry season, only by watching the tides are ships able to pass the shallow sandbars. That such deterioration of the main approach to the Harbor must cause considerable inconvenience to the trade of Canton is evident, and year after year complaints are made by the shipowners and merchants of the conditions in the river. If nothing is done to ameliorate these conditions not only will the trade of the city deteriorate, but the time will come when Canton will be shut off from the sea and become an inland city.

Already in 1917 the Board of Conservancy Works investigated the shipping conditions of the approach to Canton and on basis of these investigations the Board's Engineer-in-Chief compiled a comprehensive report containing recommendations and estimates. He arrived to the conclusion that the Back Reach should be dredged and trained to a depth of 4.9 m. (16 feet) at low water ordinary spring tide, after which vessels having a draft of 4.41 m. (14.5 feet) would be able to pass in and out at any time, vessel with a draft of 5.54 m. (18.2 feet) twice a day, and vessels with a draft of 6.33 m. (20.7 feet) at spring tides.

The cost of the proposed improvement will now amount to about 4,400,000 Hong Kong dollars divided between the following work :—

Works at Maitland Passage	H.K.$1,250,000
Improvement of Taishek Shoal	270,000
Improvement below and above Taishek Crossing.	1,850,000
Improvement within the Canton Harbor Limit at Macao Fort and Honam Spit	680,000
Supervision and Administration	350,000
Total	H.K.$4,400,000

The scheme would be completed in four years' time.

Transportation Facilities in Siam

The building of railways in a country where transportation was accomplished for centuries only by the slow processes of pack animals, bullock carts and waterways has been the most striking feature of modern development in Siam. One of the most efficient railway systems in the east now penetrates the principal regions of the interior and connects with an outside line of international commercial importance. Bangkok has excellent connection with Singapore, and there are three additional lines, extending northward, eastward, and northeastward. According to present plans of the Government, which owns and operates practically the total railway mileage, the Siamese railway system will eventually be linked with those of Burma and French Indo-China. Present railway construction is part of a 10-year program inaugurated in 1920, which includes completion of the four main lines mentioned, together with branches, and conversion of all lines to 1-meter gauge. The Minister of Commerce and Communications, Prince Purachatra, is commissioner general of the Royal State Railways.

State railways are known as the northern, southern, eastern, and northeastern lines, and the total length open to traffic at the close of the fiscal year 1926-27 amounted to 2,738 kilometers (1,698 miles). The northern line, begun in 1897 and completed in 1921, follows the Menam River northward, crossing through the hilly country to Chiengmai, the most important city of the north, 750 kilometers (465 miles) from Bangkok. The distance is traversed by express trains in 26 hours, which is in marked contrast to the six weeks formerly required to travel from Bangkok to Chiengmai wholly or largely by water.

Completion in the latter part of 1926 of the Rama VI Bridge over the River Menam Chao Phya above Bangkok marked the linking up of the northern and southern sections of the railways. The two main divisions of the country were thereby united for practical purposes, thus greatly facilitating communication and the transportation of produce. The southern line extends 1,200 kilometers (744 miles) from Bangkok south to Padang Besar, in the Federated Malay State of Kedah, where it connects with the Federated Malay States line to Penang and Singapore. Work on the southern section was begun in 1918, and through-express service with sleeping-car accommodations was inaugurated in 1922, making the trip from Bangkok to Singapore in 58 hours.

The northeastern line runs from Bangkok *via* Korat to Khorn Ken, in the northeastern Circle of Udorn. The road was in operation in June, 1926, as far as Korat, the remainder being under construction. A branch eastward from Korat runs to Ubol Rajadani, in Isam Circle, almost at the French Indo-China frontier. Work was completed in 1926 as far as Surindra. The eastern line, completed early in 1927, connects Bangkok with Aranya Pradhesa, on the frontier of French Indo-China. It is hoped that this terminus will eventually be connected with Saigon.

Equipment of the State railways is considered modern and in good condition. Bids for locomotives and other rolling stock are frequently called for. In 1925 eight locomotives were purchased in the United States. Compared with a capital outlay of about 6,000,000 bahts ($2,640,000) in 1897, when the railways were begun, 167,000,000 bahts ($73,500,000) had been invested by the close of the fiscal year 1926-27. Operating revenues amounted to 16,860,000 bahts ($7,420,000) in that year and operating expenses to 6,400,000 bahts ($2,820,000). Rolling stock in use at the close of the year included 163 locomotives, 341 passenger cars, and 2,908 freight cars.

The 10-year construction program is being carried out systematically, giving Siam a larger railway mileage per 1,000 square miles than Indo-China, the Philippine Islands, Netherland East India, or China. There still remain, however, considerable sections of the interior where networks of waterways are the traditional and customary means of transport. An adequate highway system, to which the Government is turning its attention, may in time provide feeders to the railways from these sections.

Private railways of Siam consist of six short lines, covering a total of 131 kilometers (81 miles). The longest line, of 80 kilometers (50 miles), is used for log transportation in the teak forests.

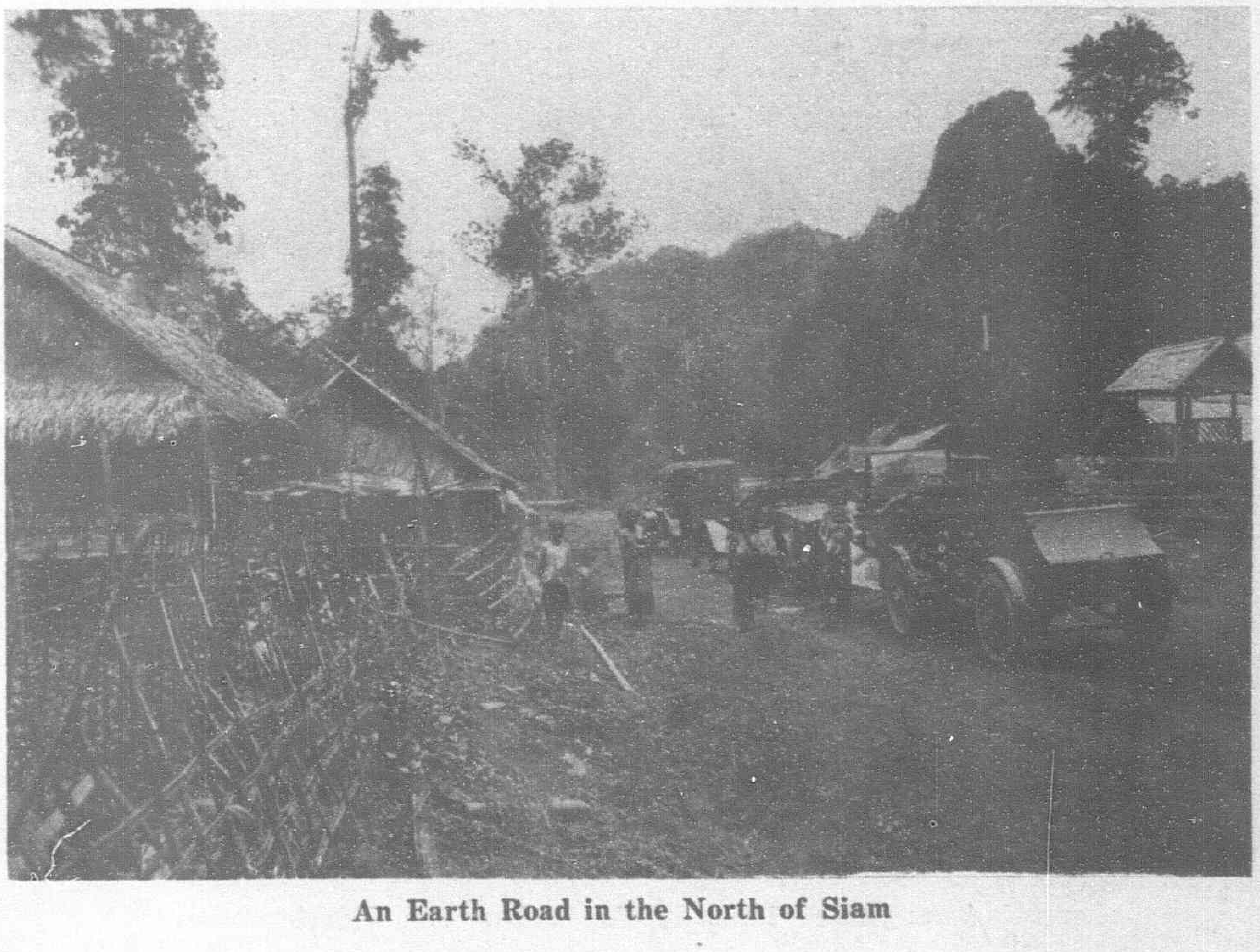
Roads

In the development of a system of transporation the railway has by far exceeded the highway. While jealously proud of its "iron horse," Siam lags far behind the neighboring countries of Indo-China and British Malaya in the construction of roads. Highway development has been held in abeyance largely because of financial exigencies, but, according to the ministry of commerce and communications, the next step in the extension of transportation facilities will be the construction of a co-ordinated system of highways, which will supplement and consolidate the railway system. The introduction of the automobile has served to a large extent as an incentive to road building as a means of communication as well as transportation.

At the close of the fiscal year 1925-26 there were 1,172 kilometers (728 miles) of State highways, under direct control of the Government, open to traffic and 559 kilometers (347 miles) were under construction. Of the completed roads, 824 kilometers (512 miles) were in southern Siam, and of those under construction, 311 kilometers (193 miles). About 80 per cent. of the total mileage was classified as roads of third-class construction. In addition to the State highways, there were 247 kilometers (154 miles) of completed provincial roads in 1925-26 and 312 kilometers (194 miles) under construction.

A metaled highway in northern Siam running from Nakon Lampang to Chiengmai has evolved from a natural trail of traffic existing for many ages between upper Burme and Siam. According to the American consul at Bangkok, reporting in January, 1928, 40 motor buses traversed the road daily, an die addition there wa au regular freight servsic by motor truck. Along the new highway numerous settlements are springing up near the Burmese frontier where not a great many years ago only hill tribes were to be found.

(Continued on page 569)



An Earth Road in the North of Siam

The Largest Dutch Motor Ship

The "Johan van Oldenbarnevelt," the Biggest Passenger Vessel Trading to the Dutch East Indies. Twin-screw 14,000 b.h.p. Machinery.

In certain trades the oil engine has a very marked influence on shipping and on the class of vessel employed. This is notable, for instance, in the new ships that have been built during the past few years to trade to California, and it is equally evident in the cargo and passenger ships constructed for scheduled services between Holland and the Dutch East Indies.

Since they placed their first motor ship in service the Rotterdam Lloyd and the Netherland Steamship Co. have built or ordered 30 large passenger and cargo motor vessels, and have not constructed a single steamer, which seems ample proof of the advantage of oil-engine propulsion for trade between Holland and the East Indies.

The passenger vessels have in graduation increased in size and speed, and, for instance, whilst the first ship for the Netherland Steamship Co., the *P. C. Hooft,* a vessel of 15,000 tons gross, was a 16-knot ship, the two now under construction, the *Johan van Oldenbarnevelt* and the *Marnix van St. Aldegonde*, are of 19,000 tons gross, and will average a speed of 18 knots.

These two ships represent an advance in many respects, both from the engineering standpoint and as luxurious passenger-carrying liners. They will be the largest liners of any sort trading to the Dutch East Indies, the largest motor ships built in Holland, and the largest motor vessels on the Eastern run.

The following are the main details :—

Length on 28-ft. 3-in. waterline, 600-ft.
Length between perpendiculars, 580-ft.
Breadth, 74-ft. 6-in.
Depth to F deck, 30-ft. 9-in.
Gross tonnage, 19,000
Speed, 18 knots
Engine power, 14,000 s.h.p.
Passenger accommodation—
  1st and 2nd class, 620
  3rd class, 64
  4th class, 50

Plans of these very interesting vessels are given on page 96a and the engine-room plans on page 97. The two Sulzer engines of 7,000 s.h.p. each are described in detail in connection with another article, and will not be referred to further in the present instance.

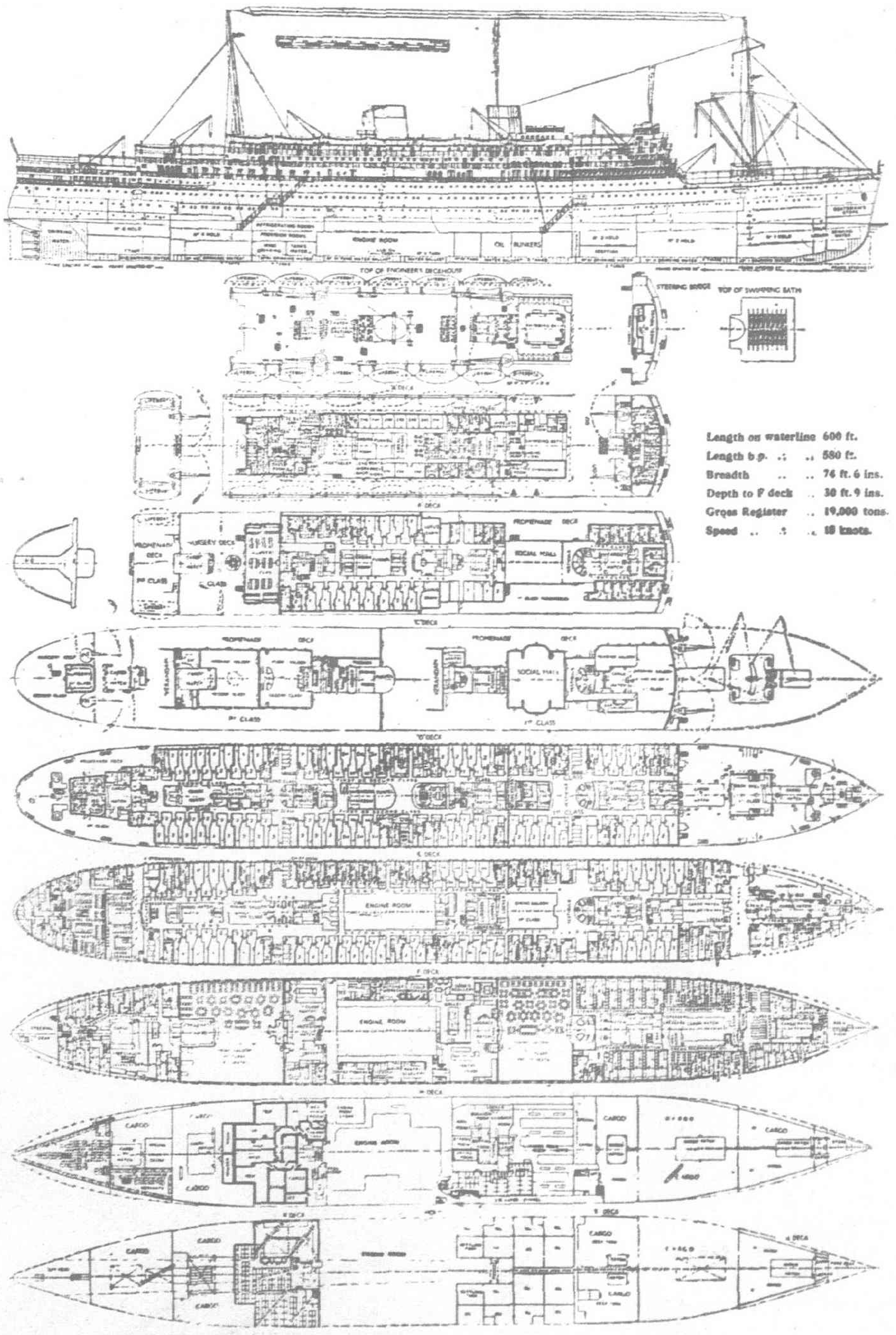
The *Johan van Oldenbarnevelt* and the sister ship contain certain features not to be found in other passenger liners on this route. They are provided, for instance, with a swimming bath, and some of the public rooms are, perhaps, on a more imposing scale than those in the slightly smaller vessels. These apartments are mainly on C deck, and a smoking saloon and reading-room are forward, leading into a vestibule giving access at the after end to the social hall, which is 18-ft. 3-in. high. Second-class public rooms are arranged on the same deck aft, including a music saloon 10-ft. high, a smoking-room and, right aft, a nursery, where there is a nursery deck.

Cargo is carried in five holds, three forward and two aft of the engine-room, and forward of the engine-room are the oil bunkers. As in the other liners of the Netherland Steamship Co., the oil fuel is not carried in double-bottom tanks, which are utilized either for drinking water or ballast water. Drinking water is also provided in the fore and afterpeak tanks. The two dining-rooms for first and second-class passengers respectively are on F deck, the former having a maximum seating capacity for 270 people and the latter for 350.

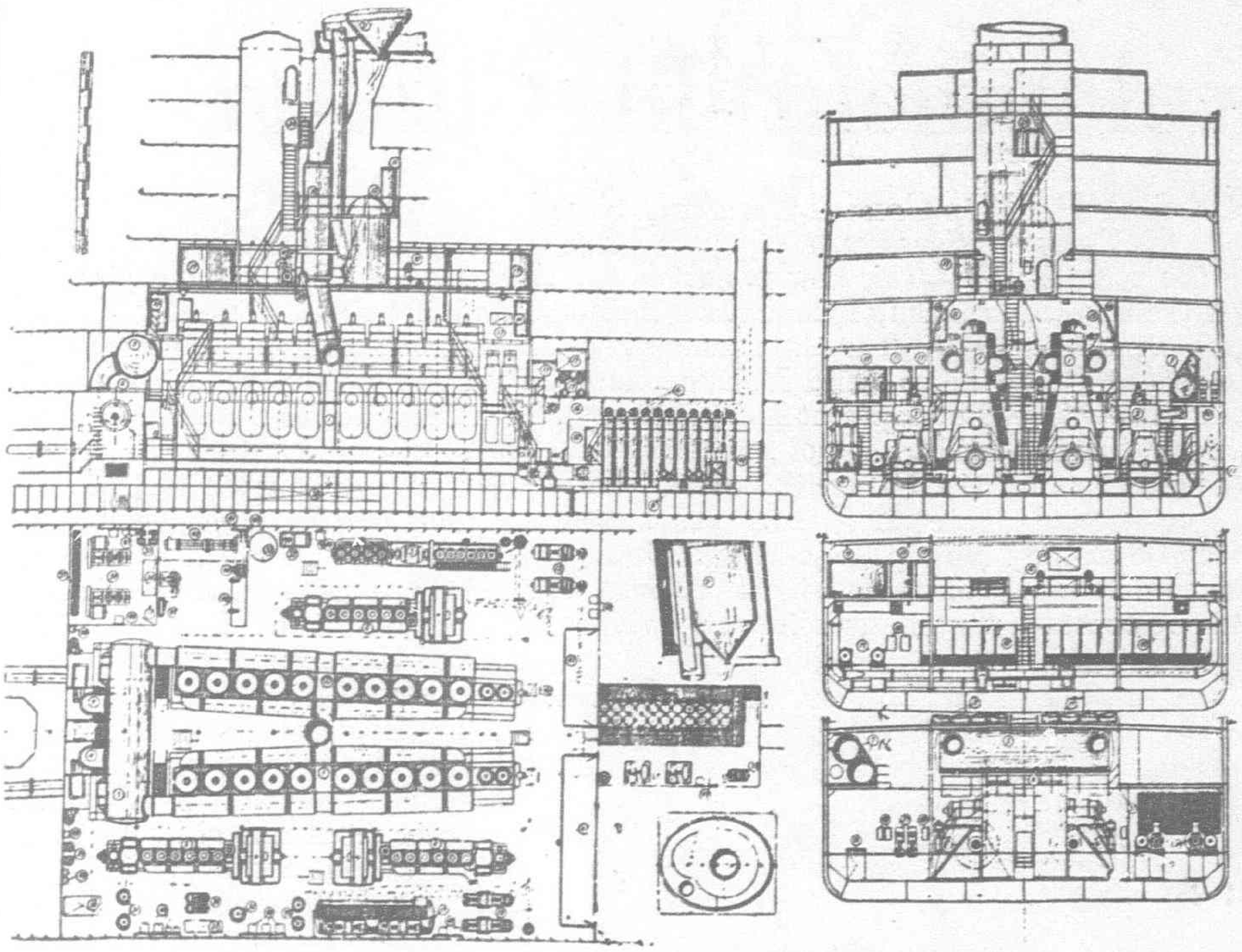
It will be noted from the drawings that the *Johan van Oldenbarnevelt* is a two-funnelled ship, the funnels being somewhat lower than the normal, also that she has a cruiser stern.

On deck are five 3-ton Scott winches and two 10-ton machines of the same type. The deck cranes are of the Stork Hijsch construction and of these there are 12, 40 h.p. Laurence Scott motors being used for the hoisting motion and 8 h.p. motors for slewing There are four Duyvis capstans driven by 55 h.p. Scott motors.

The general arrangements of the machinery in the engine-room can also be studied from the engine-room plans. There are two electrically driven scavenging blowers, supplying air to the propelling engines. The auxiliary generating plant comprises three six-cylinder two-stroke single-acting engines of the Sulzer type, driving dynamos, in addition to a four-cylinder compressorless Sulzer engine


Length on waterline 600 ft.
Length b.p. .. .. 580 ft.
Breadth .. .. 74 ft. 6 ins.
Depth to F deck .. 30 ft. 9 ins.
Gross Register .. 19,000 tons.
Speed .. .. .. 18 knots.
ENGINE ROOM
OIL BUNKERS
TOP OF ENGINEER'S DECKHOUSE
TOP OF SWIMMING BATH
PROMENADE DECK
SOCIAL HALL
NURSERY DECK
1st CLASS
2nd CLASS
CARGO

General Arrangement Plans of the "Johan Van Oldenbarnevelt"



Engine-Room Plans of the "Johan Van Oldenbarnevelt"

(1) Main engines. (2) Diesel-driven generators. (3) Diesel-driven compressor and generator. (4) Turbo scavenge pumps. (5) Scavenging-air receiver. (6) H.P. air reservoirs. (7) L.P. air reservoirs. (8) Fuel transfer pumps. (9) Fuel pumps. (10) Fuel-oil centrifuges. (11) Fuel-oil tanks. (12) Fuel-oil tank with heating coil. (13) Cooling-water pumps. (14) Piston cooling-water tank. (15) Lubricating-oil pumps. (16) Lubricating-oil centrifuges. (17) Lubricating-oil tanks. (18) Boiler. (19) Exhaust-gas boiler. (21) Spark collector. (22) Fans for boiler. (23) Lighting-up arrangements. (24) Fuel-oil tank for boiler. (25) Hot well. (26) Feed pumps. (27) Fresh-water pumps. (29) Sanitary pumps. (30) Ballast pump. (31) Bilge pumps. (32) Sewage pump. (33) Sewage tank. (34) Refrigerating engines. (35) Brine pumps. (36) Brine tank. (37) Ammonia condenser. (38) Drain tank. (39) Emergency compressor. (40) Hot sea-water pumps. (41) Motor for engineers' workshop. (42) Lathe. (43) Drilling machine. (44) Emery stone. (45) Grindstone. (46) Working bench. (47) Switchboard. (48) A.C. converter. (49) Starters for electric motors.

coupled to a dynamo, also to an auxiliary air compressor. An exhaust-gas boiler is provided, the exhaust from the main engines being passed through it and, in addition there is an ordinary oil-fired boiler. The inclusion of a spark arrestor is notable. This is an invention of Mr. Visker, the superintendent-engineer of the Netherland Steamship Co.

The arrangement of the pumps and other auxiliary plant may be noted from the engine-room plans.

It is understood that the *Johan van Oldenbarnevelt* will be completed before the end of the year.—*The Motor Ship.*

Transformation Facilities in Siam

(Continued from page 567).

A number of short highways are suitable to motor traffic, especially roads which cross the peninsula. As yet, however, there is no highway connection with Bangkok from the interior, although the city itself is equipped with metaled roads of good construction.

Throughout the interior of the northern and central sections many of the roads are traversible only by bullock carts. Others are available for motor cars only in the dry season. Road traffic, however, is very heavy throughout the north-central regions. Innumerable bullock carts pass in long trains over all the principal roads, and there is constant intercourse between the northern towns and Burma, Indo-China, Yunnan, and southern China. Travel to Burma is mainly by bullock cart; to Indo-China, carts are used to the Mekong River and the journey finished by boat; while in the trade with Yunnan, pack ponies are still employed.

Considering the fact that less than 20 years ago there were no roads in northern Siam and that even the number of bullock carts was small most of them being owned and rented by native princes, highway transportation is proceeding with reasonable expedition. The Siamese budget for the fiscal year 1927-28 contained a grant of about 2,500,000 bahts ($1,125,000) for the department of ways, which was a considerable increase over the previous year's appropriation. The additional sum is intended mainly for the construction of new highways.

Aviation

Siam's practical interest in aviation dates from 1911, when, after special study in Europe, a flying corps of the army was formed which later developed into the Royal Aeronautical Service under the ministry of war. A separate budget is provided for aviation, and five military schools offer training in flying. Airports are located at Chiengmai, terminus of the northeastern railway line, and at Ubol, in eastern Siam. There is also a landing field at Bangkok, which, however, can not be used at all times on account of the moist condition of the low-lying ground. Bangkok has been a station for several important flights, including that of the United States Army world fliers.

In addition to the Government's interest in aeronautics, there is a civil branch, aiming to develop practical use of aviation in public service. Through private subscriptions, ambulance planes are operated in connection with the civil branch.

By arrangement with the recently established air mail line from the Netherlands to Netherland East India, Siam is included in some of the flying schedules, which now operate on approximately a monthly basis.

Tin Dredges in Malaya

THE Kampar Malaya Tin Dredging, Ltd., which was organized to acquire and operate a tin-bearing deposit situated on the Kampar River, Kinta District, State of Perak, Federated Malay States, was registered in London, on March 16, 1927.

The Capital is £250,000, of which approximately £200,000 was issued and fully-paid. It is recorded that the property, or portions of it, had been prospected by Capitan Chung Thye Phin, Messrs. J. M. White, W. J. L. Smith, Thomas & Hornidge, and Alluvial Tin (Malaya), Ltd.

The present dredge was ordered during the early part of the year 1928 and was placed into operation on May 10, 1929. It was designed by Yuba Associated Engineers, of California, U.S.A., Consulting Engineers, of Anglo-Oriental Mining Corporation, Ltd, the General Managers of the Company.

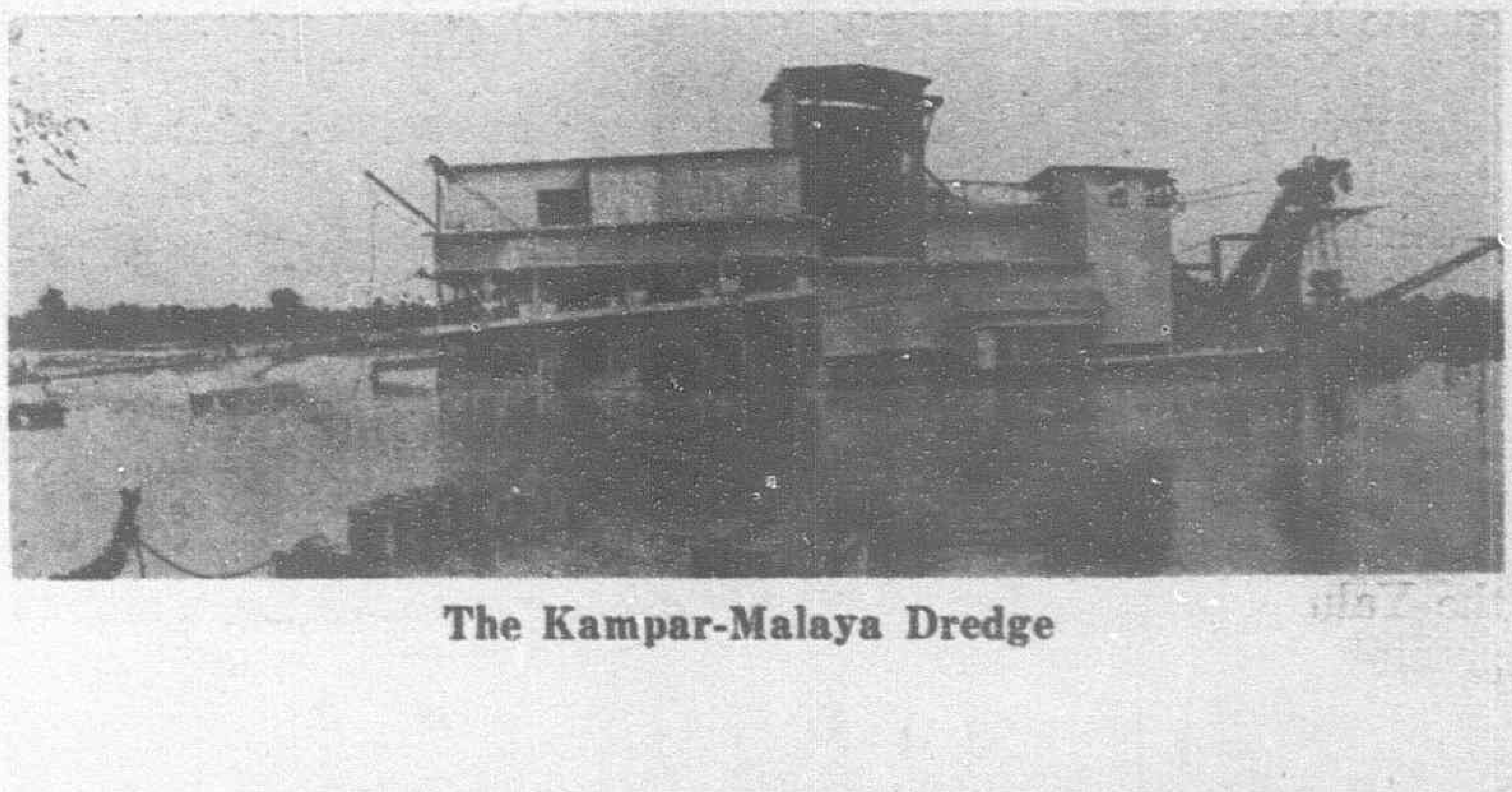
A general outline of the specification is as follows:—

This dredge is of the close connected bucket elevator type designed to dig to a depth of 75 feet below the surface of the water in which the dredge floats. The machinery is electrically-driven by motors, power being delivered from the shore through a cable especially constructed for the purpose.

The hull, superstructure and gantries are of steel. The well for the ladder is cut back from the bow and the bow is tapered in on each side to allow for clearance between the hull and bank. The dredge digs on a headline.

The power is furnished by Perak River Hydro-Electric Power Company, Ltd.

Electrical energy in the form of three phase, alternating current, 50 cycles, is taken from the Perak River Hydro-Electric Power Company, Limited's system, the power being transmitted from the Steam Station at Malim Nawar, to the Mine Substation by means of a 6,600 volt overload line approximately 4,750 yards in length and having line conductors of .035 square inch in section.



The Kampar-Malaya Dredge

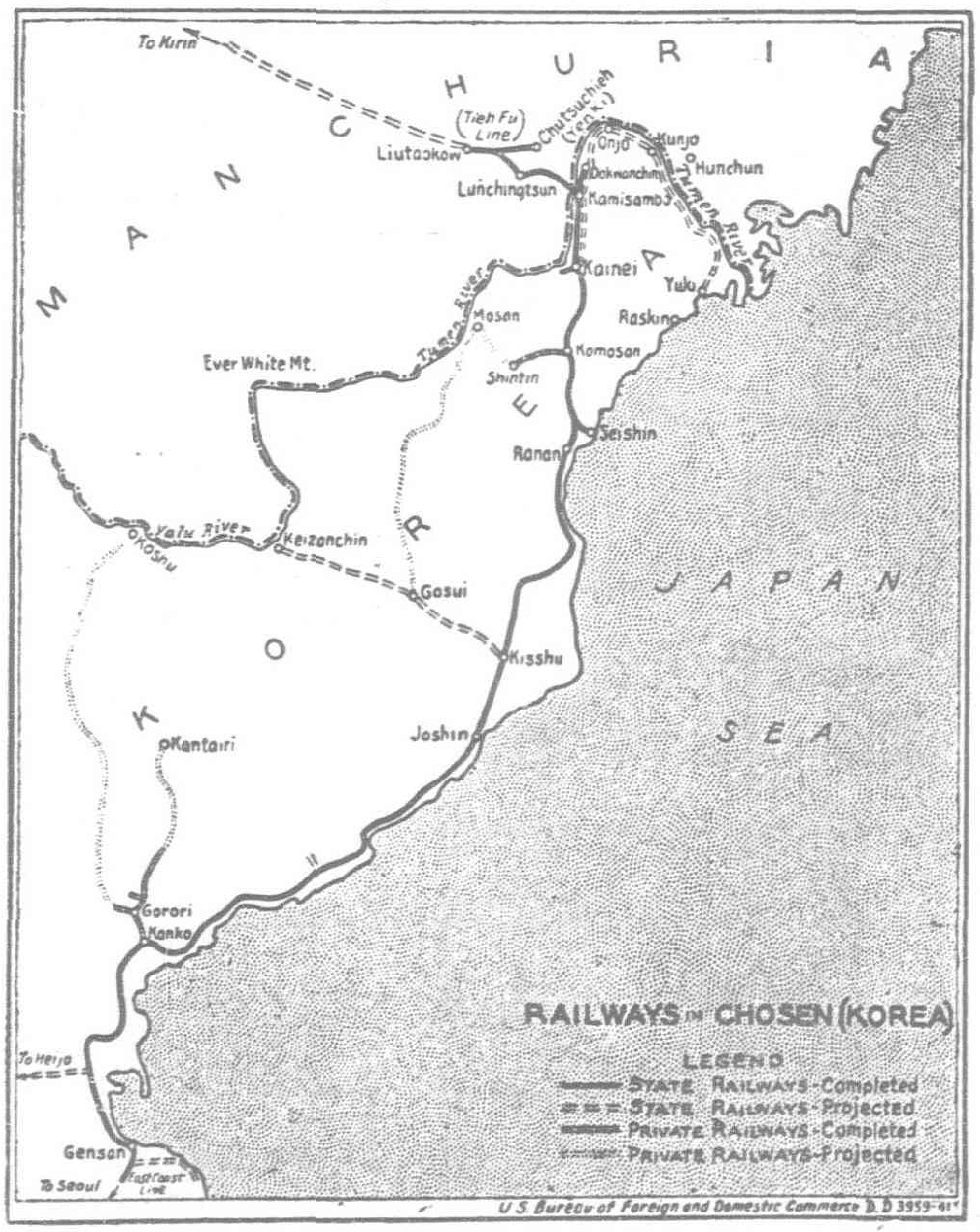
Railway Development in Chosen

By RANSFORD S. MILLER, Consul-General, Seoul

On October 1, 1928, a ceremony to celebrate the completion of Kanko railway line (Gensan-Kainei) of the Chosen Railways was held at Ranan, the provincial capital of North Kanko.

This line is a continuation of the Seoul-Gensan line and extends from Gensan, in South Kanko Province, to Kainei (Korean " Hoiryung "; Chinese " Huining "), in North Kanko, a distance of some 383.8 miles. After leaving Kanko, the provincial capital and industrial center of South Kanko, situated 77 miles north of Gensan, the road skirts along the sea coast to Joshin, a distance of some 150 miles, passing through numerous tunnels and offering a succession of mountain and sea views' which rival those of the famous scenic " Sanyo " route along the Japanese coast of the Inland Sea. From Joshin the line crosses the base of a large headland until it meets the coast again as it approaches the port of Seishin, some 115 miles farther north; from this point it strikes inland, due north a distance of 58 miles, to Kainei, situated on the Tumen river, which forms the national boundary between the Chosen Peninsula and Manchuria on the west and north, and the Maritime Provinces of Asiatic Russia on the north-east border.

The construction of the Kanko line was begun in 1914 and completed in 1928, at a cost of about Y.90,000,000 ($45,000,000).



State Railway Construction in Korea

The Tumen (Tomon) line (State), an extension of the Kanko line mentioned above, will start from Kainei and follow the course of the Tumen river around the extreme northern boundary of Chosen, a distance of 97 miles, to Yuki, an important port on the Japan Sea. This line, now under construction, is included in the new railway-building program already adopted and approved by the Japanese Diet.

The Tumen (Tomon) is a private narrow-gauge line, already constructed along the Tumen river between Kainei and Dokanchin, a distance of 37 miles. It will be absorbed by the State line, which is to run over the same route.

Projected State Railways

The new railway building program includes the following projects: A State railway running west from Kisshu (near Joshin), on the Kanko line, to Keizanchin (88 miles), on the upper reaches of the Yalu river; another State railway will start from Heijo (Pyengyang), on the Seoul-Shingishu line, and extend in a northerly direction to Manpochin (178 miles), also on the Yalu river; and a third projected State railway is to be built across the Peninsula connecting Gensan with Heijo (about 85 miles).

The purpose of these new lines is to facilitate the protection of the 500 miles of north-western frontier, much of which runs through rough and undeveloped country that is particularly exposed to attack from the opposite bank of the Yalu. It is also proposed to build a light (2½-foot gauge) " development railway " along the Yalu border, further to facilitate the frontier defence and to promote the colonization and development of this remote region.

This new project is described by the chief of the engineering section of the Chosen Railways, as follows:—

" The Government has drawn up plans for the construction of the so-called Hokusen Takushoku Keiben Tetsudo (North Chosen Development Light Railway). According to the plans, this railway will consist of three lines—one from Mosan in North Kanko (about 34 miles south-west of Kainei) to Hakugan on the Keizan line, extending 114.3 miles; the second from Keizanchin to Kokai (on the Heijo-Manpochin line, near Manpochin), a distance of 155.4 miles; and the third from Manpochin to Shingishu, 183.3 miles. Two branch lines also will be constructed—one from Shinho (about midway between Manpochin and Shingishu on the Yalu) to Teishu on the Seoul-Shingishu line (about midway between Shingishu and Heijo), a distance of 72 miles, and the other from Shingishu to Tashi Island (at the mouth of the Yalu), extending 18 miles, making a total of 543 miles. The total cost of construction is estimated at Y.41,140,000, to be spread over 10 years beginning with 1929."

Though it is reported that the Government financial authorities in Japan do not look with favor on this proposed plan at present, because of the pressure of financial difficulties, the new project has powerful support and strong grounds of appeal, and doubtless will eventually be adopted. It is even estimated that a standard-gauge line over this route is being considered in official quarters. The offices of the Chosen State Railways are located at Heijo, Chosen.

Projected Private Railways

The network of State railways outlined above is supplemented by the following private railways, which have been projected and partially completed:

North Kanko line of the Chosen Tetsudo Kaisha.—This line is to extend from Komosan, on the Seishin-Kainei section of the Kanko Railway, westward to Mosan, on the Tumen, thence in a southerly direction to Gosui, on the Keizan line—a total distance of 120 miles, of which a section of 23 miles from Komosan to Shintin is under operation. It is narrow gauge, and the section extending from Mosan to some point on the Keizan line will doubtless be absorbed by the North Chosen Development Light Railway, should the latter project be carried out.

South Kanko line of the Chosen Tetsudo Kaisha.—This line, also narrow gauge, starts from Kanko and is to extend 146 miles to Koshu on the frontier, with two branch lines, one from Gorori to Kantairi (53.2 miles), of which 47.1 miles are under operation, and the other from Hojori to Chohori (1.6 miles).

Japan Electric Power Co. is Granted New Franchise

The Japan Electric Power Company has been granted the right of supplying current to power consumers in the Tokyo suburbs. The power concern was notified by the Communications Department to the effect that it can supply the power needs of three of the Tokyo counties of Minami-Katsushika, Minami-Adachi and Kita-Toshima in addition to the Tsurumi Section of Kanagawa prefecture where it has one of its steam generating plants located.

30,000-kVA Synchronous Condensers for the Showa Denryoku K.K., Nagoya (Japan)

The Showa Denryoku K.K., which belongs to the Daido Denryoku K.K., owns the two Shokawa Power Stations I and II on the banks of the river Showa. These power stations supply Yao Substation in the south-east of Osaka through Fukumitzu Sub-station and over a 320 km long, 154,000 V transmission line. At Tahara Substation the new transmission line is coupled with the line, which has been in existence for some time, from the power stations on the river Tenryugawa to Osaka Substation I. The geographical nature of the country in this district is shown in Fig. 1.

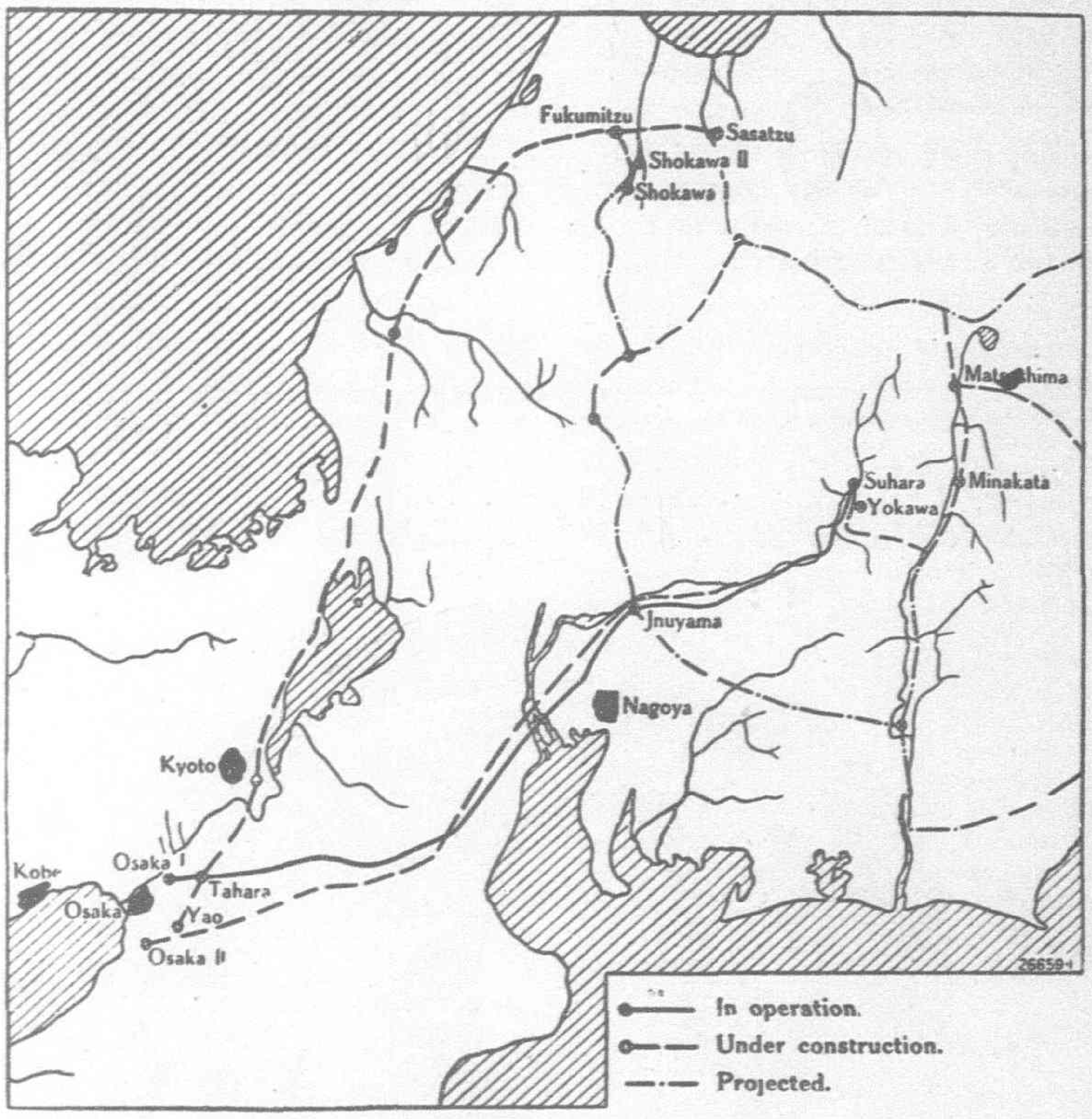


Fig. 1.—Map of the 154,000-V Transmission Lines of the Daido Power Supply Company

Yao Substation

This substation contains five 60,000 kVA transformer sets, each comprising three single-phase three winding transformers which step down the incoming pressure at 140,000 V to 77,000 V and to a tertiary pressure of 11,000 V. The energy is further transmitted at 77 kV to the existing substations in the district round Osaka, at distances varying from 10 to 40 km. The 11,000 V delta-connected tertiary windings of the transformers are connected up to the synchronous condensers supplied by Brown, Boveri & Co. Three more similar synchronous machines will be supplied later. A diagram of connections of Yao Substation is reproduced in Fig. 2.

The Synchronous Condensers

One of these is shown in Fig. 3. Each machine is designed for the following conditions:—

Rating:

30,000 kVA at zero power factor leading 25,000 kVA at zero power factor lagging.

Line voltage	11,000 V
Speed	600 r.p.m.
Overspeed	750 r.p.m.
Frequency	60 cycles
Total weight of one machine approx. ...	140 tons

The machines are totally enclosed, and, to facilitate transport, are provided with stators in two parts, in which the laminations are secured with bars of trapezoidal section and pressed firmly together by strong end plates and bolts. These plates are furnished with special, strong fingers for supporting the teeth of the core. The former-wound coils are laid in the slots, which are of the full-open type. A noteworthy feature is the very compact form of the coil heads, made necessary by the loading gauge of the European and Japanese railways over which the machines had to be transported. The arrangement of the windings will be seen from Fig. 4. When dismantling the machines for transport after the final tests had been carried out, the coils which pass from one part of the stator to the other were removed, but all other coils were left in place. Stator end covers, built up in several pieces, prevent accidental contact with the windings and at the same time ensure that the cooling air flows in the correct direction. Cooling is effected by a double set of vanes bolted to the rotor; these draw in air from the fresh-air conduit in the foundations of the machine, and, after it has passed over the parts to be cooled, discharge it radially at the circumference of the stator into the warm-air conduit, which is also arranged in the foundations. Six thermo-couples for indicating the temperature are fixed in the stator slots. The leads, laid in Bergmann tubes, to these thermo-couples, can be readily seen from Fig. 4.

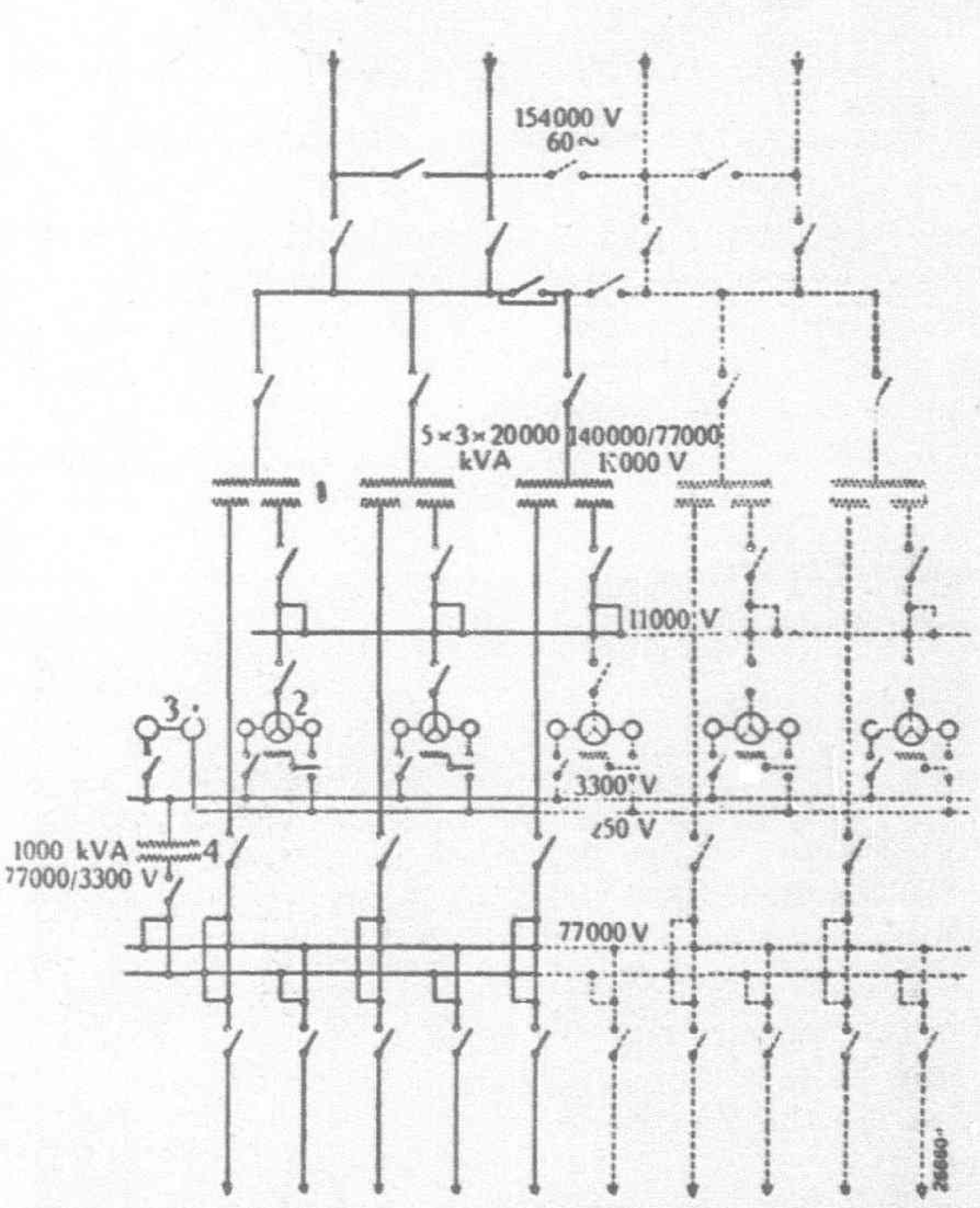


Fig. 2.—Diagram of connections of Yao Substation as at the Present Time and as Projected

(1) Three-winding Transformer
(2) Synchronous Condenser with Starting Motor and Exciter
(3) Spare Exciter Set
(2) Station Transformer

The 12-pole rotor consists of the shaft with rotor spider on to which the cast-steel discs are shrunk. These discs have dovetailed slots in which the poles are secured by claws. The pole pieces are laminated and have a strong damper winding, the bars of which are connected at both ends by massive damper rings. The rotor winding is of bare copper strip, with presspan insulation between the various turns. Cooling ribs ensure ample dispersion of the heat. Brass wedges keep the pole windings apart. A view of the finished rotor is given in Fig. 5. The shaft is forged from open-hearth steel and has a flange at one end for coupling to the starting motor.

In view of the great weight of the rotor, the bearings were arranged as near as possible to the body, and the slip rings mounted outside one of the bearings. The connections between the rotor winding and the slip rings are laid inside the bored-out shaft. The bearings are ringlubricated and

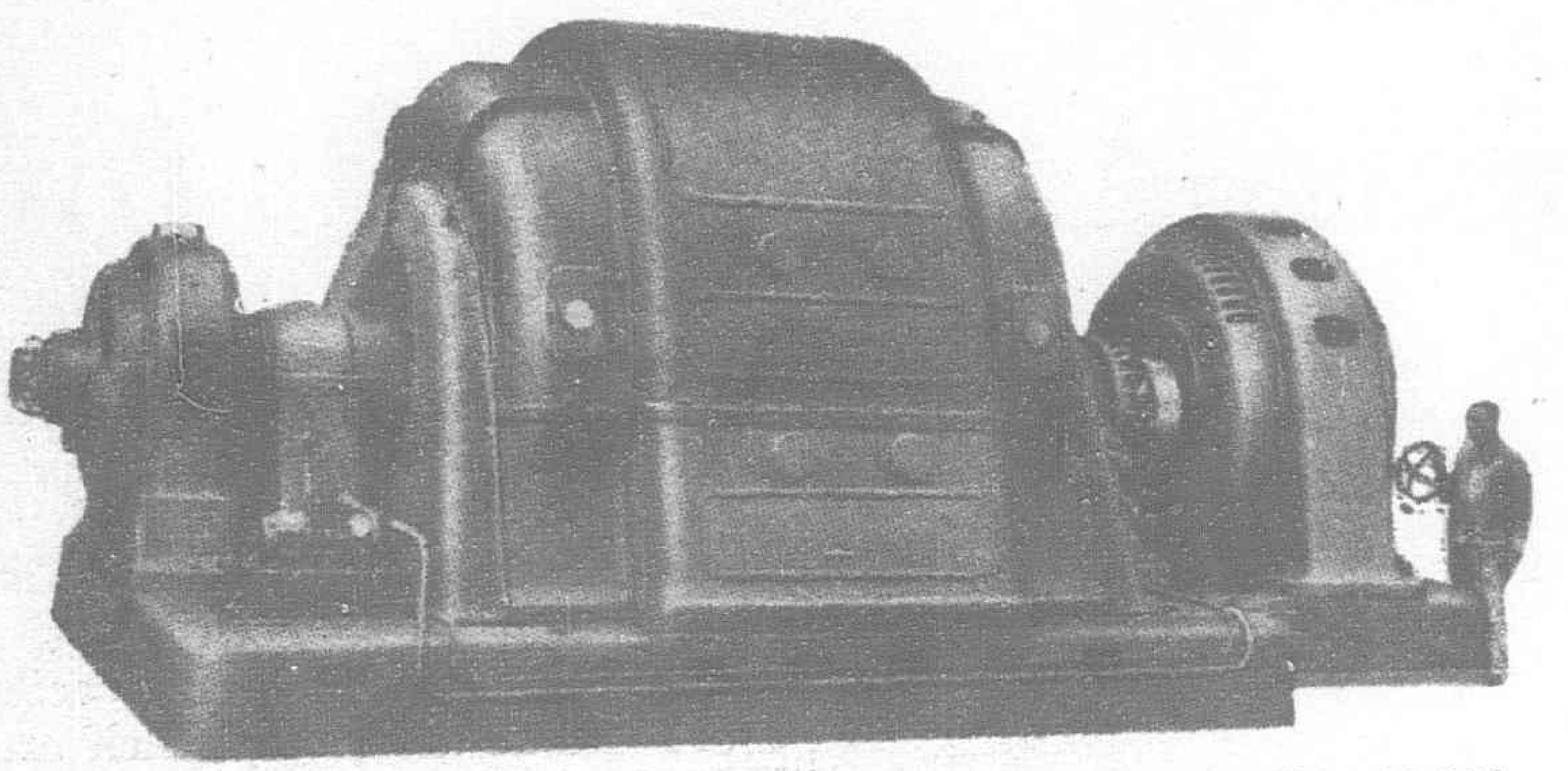


Fig. 3.—Three-phase Synchronous Condenser, 30,000 kVA, 11,000 V, 60 Cycles, 600 r.p.m., with Induction Motor for Starting, main and Auxiliary Exciters, and with Motor-driven Oil Pump for Relieving the Bearings with Oil under Pressure when Starting.

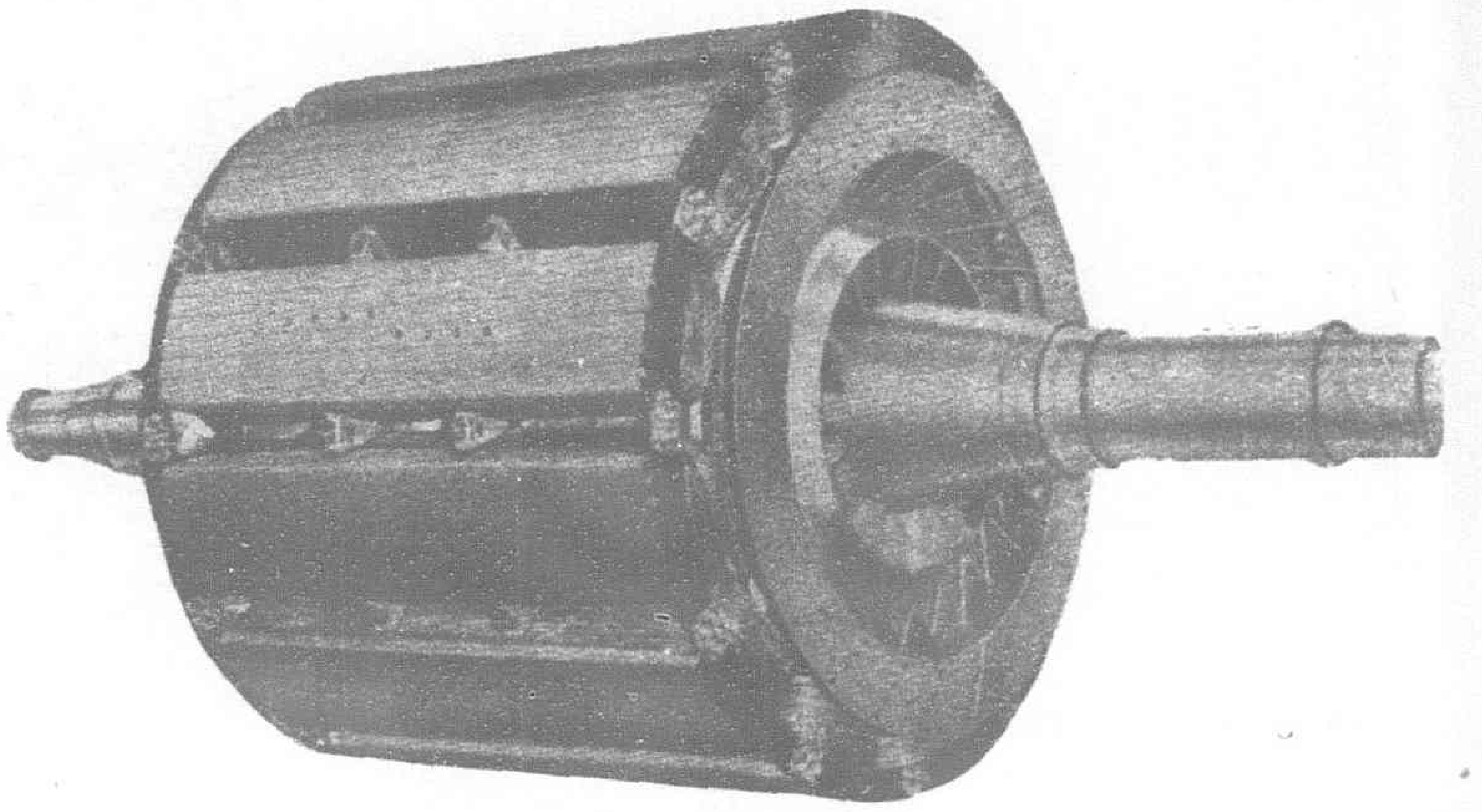


Fig. 5.—Rotor Ready for Erection

water-cooled. To make starting easier, each synchronous condenser has a motor-driven oil pump by means of which oil at a pressure of about 50 kg/cm^2 can be forced between the shaft and the lower bearing shell to reduce the friction. The oil pump with supply pipes to the bearings can be seen in Fig. 3. Thermometers built into the bearings enable the temperature of the bearing shells to be ascertained at any time.

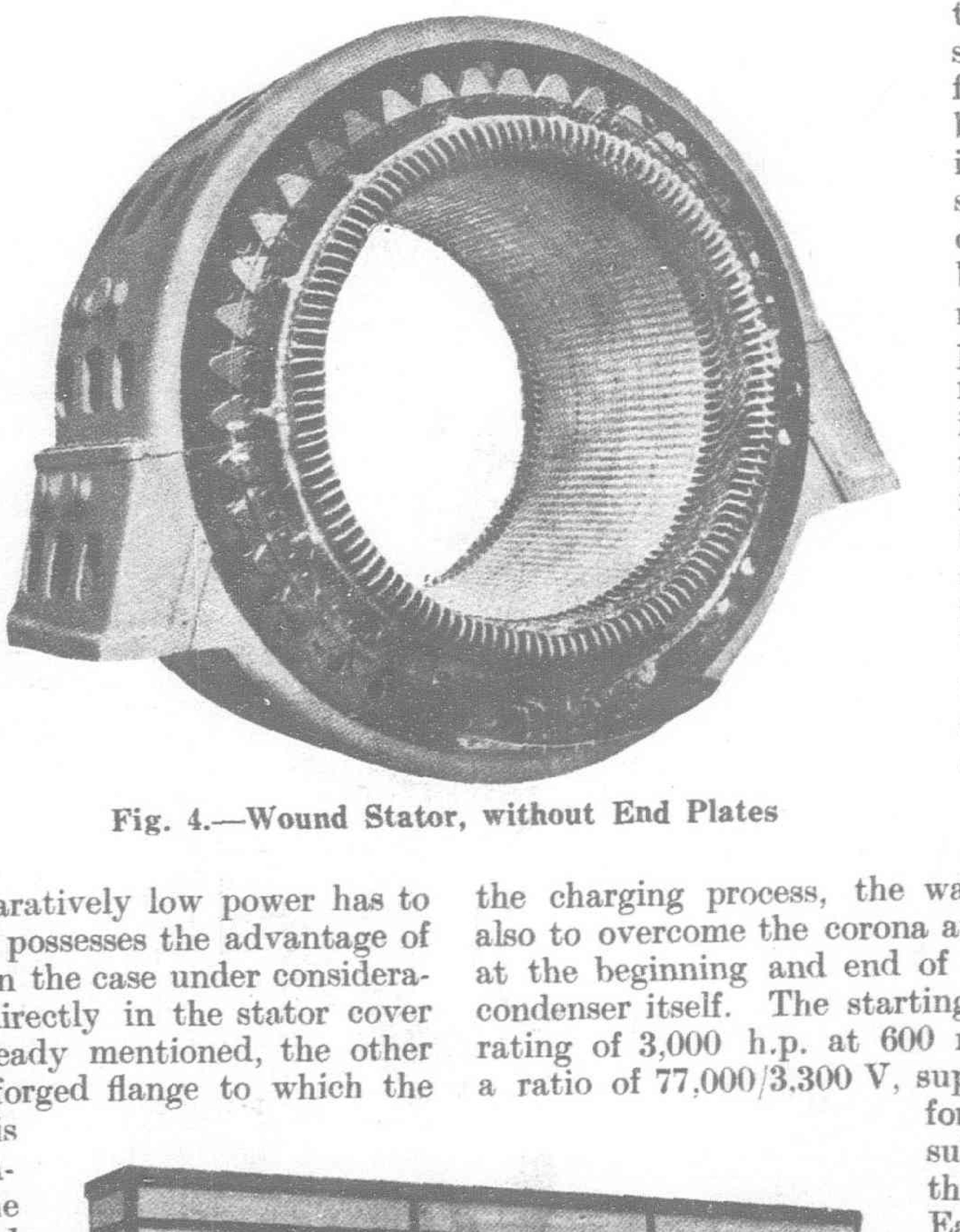


Fig. 4.—Wound Stator, without End Plates

The exciter, rated at about 200 kW at 230 V, is built overhung on one end of the shaft. Only a very small exciting current—practically zero—is required to obtain the output of 25,000 kVA with lagging power factor. In a direct-current machine, however, such a heavy reduction of the exciting current by means of a resistance in the shunt circuit is impossible on account of the instability which would result. Therefore, either a regulating resistance must be built in, which will reduce the terminal voltage but dissipate a large amount of energy, or the exciter itself must be separately excited. Brown, Boveri & Co. prefer the second method and use an auxiliary exciter with compounded characteristic for exciting the main exciter. The regulation is, therefore, effected in the main circuit of this auxiliary exciter and thus only a comparatively low power has to be overcome. This system of regulation possesses the advantage of smaller losses and lower first costs. In the case under consideration the auxiliary exciter is mounted directly in the stator cover of the main exciter (Fig. 3). As already mentioned, the other end of the shaft is provided with a forged flange to which the starting motor, with only one bearing, is rigidly coupled. This motor, of the induction type, has two poles less than the main machine, and thus a no-load speed of 720 r.p.m. In addition to starting the synchronous condenser, this motor can also drive it for an hour at the synchronous speed to charge the line and keep it under voltage.

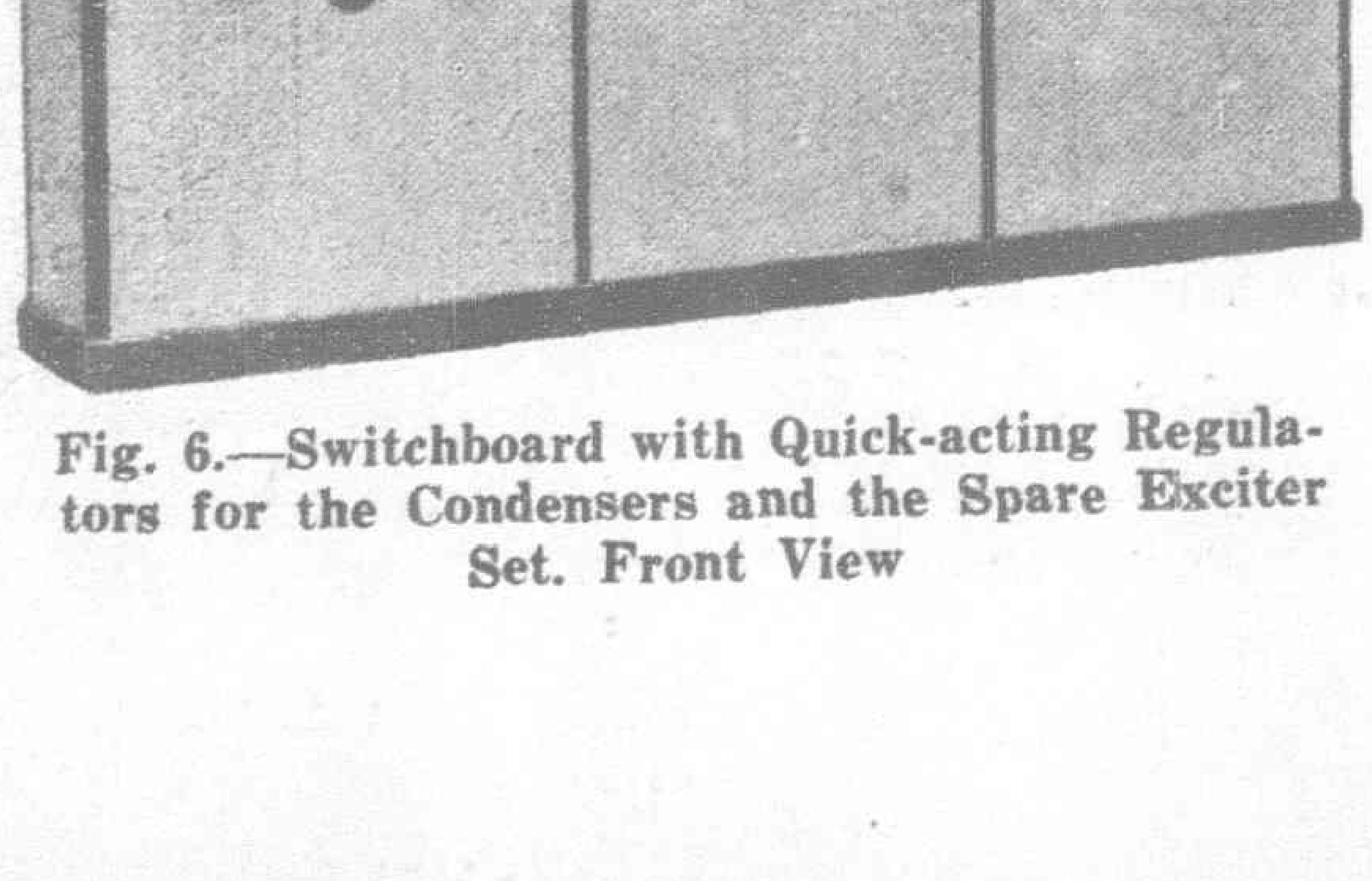


Fig. 6.—Switchboard with Quick-acting Regulators for the Condensers and the Spare Exciter Set. Front View

The apparent power required to charge the system at the normal voltage was calculated to be 23,000 kVA. As is common knowledge, the pressure of transmission lines when carrying no load increases due to the capacity, so that at the beginning of the line only a certain fraction of the rated pressure need be applied to obtain the full pressure at the end. In the present case, this fraction is 65 per cent. of the full pressure, *i.e.*, about 7,150 V at the terminals of the condenser, or, referred to the primary side of the three-winding transformers, approx. 100,000 V. This produces the full pressure of 154 kV in Sasatzu Substation, *i.e.*, in power station II at Shokawa. With the reduced pressure mentioned, the load is also only 65 per cent. of the previously-determined value, *i.e.*, 15,000 kVA, particular stress being laid on the fact that it should be possible to obtain this load without changing over the excitation. The solution of charging the transmission line from a substation instead, as in usual practice, from a power station, was adopted because the rating of an alternator in the power station is considerably smaller than that of one of the condensers; if the usual method had been followed, it would have been necessary to run several machines in parallel to charge the system. Running alternators with weak excitation in parallel is, however, unsatisfactory, due to the low synchronizing force keeping the machines in step. Charging the system from the substation is thus, in the present case, by far the most advantageous method. When the system has been charged, the alternators can, naturally, be synchronized without difficulty, and supply energy to the substation.

In addition to supplying the charging current for the line during the charging process, the wattless power of the condenser has also to overcome the corona and leakage losses, the no-load losses at the beginning and end of the line, and also the losses in the condenser itself. The starting motor was designed for a one-hour rating of 3,000 h.p. at 600 r.p.m. A special transformer, with a ratio of 77,000/3,300 V, supplies current to the starting motors for the two sets at present in the substation, and will also supply the three other sets to be installed later. Each motor has a liquid starter, with motor drive and push-button control, designed to regulate the speed to 600 r.p.m. for one hour when charging the line. When being used for either starting or speed regulation, the starter is water-cooled. A centrifugal switch mounted on the free end of the starting motor shaft trips the main oil circuit breaker when normal speed is exceeded by more than 10 per cent. A special converter set, comprising main and auxiliary exciter with common driving motor fed from 3,300 V network, is provided as a stand-by for the built-on exciters. This motor has an automatic starter which starts it up when the stator switch closes, and then short-circuits itself when the motor is running.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

HYDRO-ELECTRIC PLANT, MANILA.—Construction work is well under way on the new hydro-electric development project to be built in the Philippine Islands, by the Manila Electric Company.

This waterpower project will have a head of 633 feet and be located on the Bogotan River about fifty miles from the City of Manila. Current will be transmitted over a steel tower transmission line at a voltage of 110,000, which will be the highest voltage in the entire Orient. The initial capacity will be 25,000 horsepower the waterwheel generators being rated at 720 revolutions per minute, which will be the highest speed generators of that size ever built, the usual speed being 600 revolutions per minute. The power to be generated at this plant will take care of the major portion of the electric requirements of the City of Manila and the adjacent and intervening territory and will be augmented by steam generated power at peak loads.

YAWATA IRON WORKS, STEAM POWER STATION.—As the present capacity of the company's power stations is not enough to meet the requirements, it has been decided to build a 20,000 kw. steam power station next year. It is reported that the equipment will probably be ordered from Japanese makers.

THE KOREA HYDRO-ELECTRIC POWER COMPANY.—The Tcho Denryoku K.K. and its interested concerns have applied to the authorities to establish the Chosen Suiryoku K.K. (The Korea Water Power Co., Ltd.) with a capital of Y.50,000,000. According to the plans, the company will build five hydro power plants on the Kwanko River and two hydro power plants on the Kinko River; total capacity 200,000 kw. A 3,500 kw. steam power plant will also be built between Fuzan and Taiden. The total estimated cost of construction is about Y.90,000,000. The electric light and power is to be supplied to Kogendo, Zenrahokudo, Zenranando, Chuseinando and Chuseihokudo prefectures.

PYKARA HYDRO-ELECTRIC SCHEME IN INDIA.—The chief engineer for hydro-electric development of the Government of Madras, Maj. H. G. Howard, Madras, India, has recently submitted estimates for a program of hydro-electric development for the supply of electricity to the Nilgiris district and neighboring towns of Coimbatore, Madura, Dindigul, and Trichinopoly. The scheme also includes the electrification of the railways in this district. Several alternate programs have been prepared. The estimates of the cost vary from about $10,000,000 to $25,000,000, depending on the scheme selected. The proposed development will be one of the largest in the world.

TRAMWAY MOTORS FOR NEW ZEALAND.—The General Electric Company, Limited, Magnet House, London, has received an order from the Auckland Transport Board for 104 Tramway Motors, each rated at 40 b.h.p. 500 volts, on the one-hour rating. The motors will be of the G.E.C. standard self-ventilated interpole type (Oerlikon system), and will be fitted with roller type armature bearings. The order also includes the supply of resistances, lightning arresters, etc.

TAIWAN ELECTRIC POWER CO., LTD.—The Taiwan Denryoku K.K. has ordered four units of outdoor transformers of 500 kva. 60 Cycle, 3,300-2,200 V, single phase, automatic cooling, one unit automatic regulator of 120 kva. 3 phase and some distributing boards from the Shibaura Engineering Works.

UJIGAWA ELECTRIC COMPANY.—Plans are being prepared for the extension of the Ujigawa Electric Company's power station at Kizu-gawa. Three additional 35,000-kW. generators will be installed, bringing the capacity of the station up to 165,000 kW. These additions will make the capacity of the Kizu-gawa station greater than that of any other in the country.

The Central Government is being approached with regard to the proposed extension of power plant of the Yamaguchi Prefectural Authorities. The scheme includes the installation of a 45,000-kw. generator, and its total cost is estimated at about Y.8,000,000.

ELECTRIC LIGHT EXTENSION, GALLE.—Work in connection with the extension of the Galle Electric Lighting Scheme has been completed at a cost of Rs. 111,000. A new Power House equipped with two generator sets each consisting of a 110 kW. alternator driven by a 200 h.p. oil engine has been built adjoining the old one. With these it is expected that it will be possible to negotiate a load equivalent to 25,000 lamps of 20 watts each.

RAILWAYS

NOVEL STEAM CARS UNDER CONSTRUCTION IN KOREA.—It is reported that two steam cars with capacity for 64 passengers now under construction in the railway shops in Shin-Ryuzan at an estimated cost of Y.9,000 each will be completed this month put on the run between Keijo and Chemulpo and Riri and Kunsan. It is said they can develop a speed of 35 miles per hour. The cars measure 59 feet in length, the front being for the engine, the center for passengers, and the rear for the conductor's room.

THE KIRIN-TUNGKIANG LINE.—The proposed line is to run about 500 miles up northeast to Tungkiang at the convergence of the Sungari with the Amur.

Though the Kirin-Tungpin section has already been completely surveyed, a separate surveyors' party, including five engineers with 10 men, is to be organized to take up the survey work beyond under Chief Engineer Chang Kouhsien.

The new line is to run through 10 Prefectures of Kirin, Shulan, Yushu, Wuchang, Tungpin, Fangcheng, Ilan, Fuchin, Huachuan, and Tungkiang.

The latest scheme is to connect by rail Muling Station on the C.E.R. Eastern Section with Mishan, northeast thereof on the Siberian frontiers, about 100 miles distant.

NEW RAILWAY LINE AT SINGAPORE.—The proposals for the deviation of a portion of the railway on Singapore Island and the provision of a new terminal station in Singapore are now complete, and arrangements are being made to commence the work.

The deviation will start from a point near Bukit Timah, and the new line will run in a westerly direction to Tanjong Pagar, where a large and modern station is to be built on land formerly owned by the Harbor Board.

The present line from Bukit Timah to Tank Road and from Tank Road to the Tangjong Pagar goods station will, it is understood, be taken up, but more particulars will be available later.

KANHOKU LINE OF CHOSEN RAILWAY CO.—The Kanhoku line of the Chosen Railway Company between Shinten and Mosan, a distance of 15.1 miles, with a freight line of 1.2 from miles Mosan to the River Tuman opened on November 15, and it is expected that timber rafted down the Tumen will be beached at Mosan for distribution throughout the country.

NEW CHINESE LINES IN MANCHURIA AND INNER MONGOLIA.—Regarding the Tsitsihar-Koshan line; for which a public loan is being floated, the rails have been laid up to Koshan, and the line will be opened to traffic by January next.

As regards the Ssufangtai-Wangkuei branch line to the Hulan-Hailun line, the Hulan-Hailun line people are carrying on the surveys on a concrete plan mapped out thereby, and work will be started on the return of spring.

Regarding the Kirin-Tungkiang line *via* Wuchang, Imienpo, Sansing, and Fuchin, over 2,000 Chinese "li" in length, work will be commenced in autumn next year.

The plans for other lines such as one between Payen and Holikang along the Sungari in Heilungkiang Province, the Anda-Paichuan line, and the Taonan-Solun line are also being pushed forward.

LUNGHAI AND CANTON-HANKOW LINES.—A special committee to supervise the completion of the Sian-Lingpao section of the Lunghai Railway has been appointed by the Ministry of Railways, with Kwan Kan-lun as the Chairman. Construction work is expected to be started immediately after the inauguration of the Committee, as surveying of the territory to be traversed by the projected extension has already been concluded. It is also learned at the Ministry that the construction of the Chuchow-Shiuchow section of the Canton-Hankow Railway will be started next month. Part of the required expenses amounting to $450,000 has been remitted to the Ministry by the Canton-Hankow Railway Administration.

LINE TO CONNECT CHANGCHUN AND KWANCHENGTSU STATIONS.—The railway to be built between the Kwanchengtzu station on the Chinese Eastern Railway and the Changchun station on the Kirin-Changchun line is not a light railway as reported, but will be a Russian standard gauge line.

The work was started at the beginning of November and is expected to be finished in December. The entire distance is 6½ kilometres, which will be of a provisional nature.

It is ascertained that the Chinese authorities decided to push the work on this line made inevitable by military reasons, because the South Manchuria Railway flatly refused to allow the passage of Chinese troops through their railway zone on account of the neutral attitude maintained by Japan, and consequently experienced great inconvenience in sending reinforcements to the northern frontier regions.

INDUSTRIAL

ONODA CEMENT CO. TO ERECT BRANCH FACTORY AT ANSHAN.—The Onoda Cement Co. running a factory at Choushuitzu near the Railway station next Dairen, is going to found a branch factory at Anshan, the seat of the Iron and Steel Works. The new plant is to be capable of turning out 100,000 barrels of cement.

The Onoda Company has purchased the central cement factory at Yawata, the seat of the Government Steel Works, Edamitsu.

KAWAKITA ELECTRIC WORKS TO BUY OKUMURA'S FACTORY.—The Kawakita Electric Works has decided to take over the Okumura Electrical Machinery Company's factory in Kyoto, which came into possession of the 15th Bank in a recent auction. The cost of buying is Y.1,900,000.

After buying the factory, the Kawakita Works will concentrate its energy in Kyoto, moving all the equipment in its Osaka factory, and this is expected to be completed within a year.

INDUSTRIAL DEVELOPMENT OF KIANGSI.

—A comprehensive program of industrial development in Kiangsi province formulated by Mr. Fei Yen, Provincial Commissioner of Reconstruction, has been approved by the provincial government committee.

The project provides, in the first place, for the establishment of a large model experimental factory for improving various native manufactured goods. When the experiments prove successful, the new processes will be made public so that small factory owners may take advantage of the improvements. A sum of $25,000 will be appropriated for the erection of the proposed experimental factory.

The opening of cement, brick and glass works to supply the demand for supplies required for new construction works is also contemplated.

Funds will also be raised for the opening of paper and cotton mills in the province. The fact that Kiangsi is chiefly an agricultural district will render the development of these two industries comparatively easy.—*Kuo Min.*

ICE MAKING MACHINERY IN MANILA.

—San Miguel Brewery has under construction a building of 500 square meters floor space which will house the machinery. Production should begin in January or February.

The capacity of the plant will be 100 kilos per hour and it is the first aim of the Brewery to provide enough for its own use in transportation of ice-cold products. However, demands on the part of outside customers will be supplied.

Special refrigerators are necessary, provided with a type of chimney which permits the vapor to escape.

Carbon dioxide, which is necessary for manufacture of the ice, is a by-product of beer-making. This will be used, but is inadequate for the amount of ice to be made. Liquid carbon dioxide is made by a part of the machinery being brought from Germany and the Swiss machinery produces the ice. This will supplement the by-product.

MITSUBISH SEITETSU K.K.

—(Mitsubishi Steel Works Ltd.) At present there are two units of 150 tons furnaces at the Kenjiho Mill of the Mitsui Seitetsu K.K. Recently the company decided to install a 250 tons furnace in order to repair one of the 150 tons furnaces.

It is reported that the present annual production of this mill is 150,000 tons.

MATCH FACTORY AT CHANGCHUN.

—As a sister factory to the Paoshan Match Factory founded by Mr. I. Mayeda, a Japanese, at Changchun, a new match factory was opened at Changchun on November 18.

It is under individual management of Mr. S. Sato and is situated at the north of the railway track.

JAPAN ICE MANUFACTURING CO., LTD.

—Due to a great development in fisheries this year in Shizuoka prefecture, the demand for ice increased greatly and the present capacity of the Shizuoka mill is not enough to meet the demand. Therefore the company has decided to extend it. It is reported that the estimate cost of extension is about Y.300,000 to Y.500,000 and all equipment will be bought from Japanese makers, except the ammonia compressers.

THE YAWATA IRON WORKS TO MANUFACTURE SHEET PILINGS.

—The Yawata Iron Works has been investigating the import of sheet piling, the last few years in order to begin manufacture in Japan.

According to the Iron works, the total imports of sheet piling since 1926 has been as follows:

1926	10,470 Kilo Tons	
1927	14,997 „ „	
1928	20,921 „ „	
1929	24,644 „ „	(Estimate)

SOME RECENT COTTON STATISTICS.

—The Chinese Cotton Mill Owners' Association of Shanghai has recently completed detailed statistics on the total area of cotton fields and the total production of cotton in the various principal cotton producing provinces during the year 1928. Owing to the fact that some of the cotton seeds sown in North China did not grow, the cotton crops during the year 1928 showed a decrease of 110,335 *tan* although the area for cotton cultivation during 1928 showed an increase of 482,140 *mow* as compared with the year previous. The following table shows the total area of China's cotton fields in *mow* for the past ten years from 1919 to 1928.

Province	1919	1920	1921	1922	1923
Hopei	6,397,000	4,391,032	4,709,963	4,351,798	3,630,654
Shantung	3,218,000	428,330	2,333,190	3,534,707	3,677,277
Shansi	486,320	615,240	695,025	239,288	875,921
Honan	1,417,654	———	856,000	3,047,144	2,693,068
Shensi	———	1,283,650	2,405,640	1,867,200	1,642,288
Kiangsu	19,278,307	12,474,700	11,812,600	9,605,978	8,164,751
Chekiang	———	1,270,100	1,199,000	1,096,000	1,181,000
Anhwei	762,600	1,195,695	1,099,000	1,147,950	1,151,416
Kiangsi	———	398,850	256,650	361,630	689,578
Hupeh	1,478,000	6,269,700	2,849,100	7,612,900	5,848,100
Total	33,037,881	28,327,297	28,216,168	33,464,595	29,554,053

Province	1924	1925	1926	1927	1928
Hopei	3,067,903	2,895,000	2,453,000	2,490,800	2,103,140
Shantung	2,984,385	3,099,191	3,284,550	3,172,630	3,317,210
Shansi	613,145	755,000	1,407,400	1,298,559	949,355
Honan	2,677,000	2,985,700	2,881,200	2,816,950	1,566,600
Shensi	1,642,288	1,316,000	1,447,030	1,442,540	1,217,650
Kiangsu	7,760,893	7,815,016	8,129,000	7,328,619	8,824,000
Chekiang	1,867,200	1,772,920	1,731,000	1,734,200	1,730,800
Anhwei	1,036,275	841,200	433,881	436,730	469,481
Kiangsi	689,578	714,000	541,666	597,248	576,880
Hupeh	6,432,910	5,927,000	5,061,000	6,292,000	7,337,300
Total	28,771,577	28,121,027	27,349,727	27,610,276	28,092,416

During the same period, the figures for China's raw cotton production in *tan* of 100 catties (133-1/3 pounds) are given as follows:

Province	1919	1920	1921	1922	1923
Hopei	2,683,753	1,022,219	1,819,314	1,295,119	944,973
Shantung	894,558	126,070	295,077	1,005,230	1,387,666
Shansi	201,851	64,996	248,737	164,114	230,681
Honan	427,633	———	219,400	555,036	667,512
Shensi	355,000	293,967	429,967	476,600	461,954
Kiangsu	2,163,160	3,022,210	1,283,660	2,446,650	1,489,084
Chekiang	264,900	251,106	308,760	98,300	329,960
Anhwei	125,535	291,975	163,830	154,833	189,515
Kiangsi	105,000	97,860	45,325	84,623	171,537
Hupeh	1,207,000	1,580,000	615,150	2,029,850	1,271,760
Total	9,028,390	6,750,403	5,429,220	8,310,355	7,144,642

Province	1924	1925	1926	1927	1928
Hopei	798,575	958,290	814,300	770,550	653,120
Shantung	934,224	995,603	518,279	709,755	620,413
Shansi	161,502	161,502	380,583	501,872	288,980
Honan	572,141	544,634	557,427	590,220	214,282
Shensi	467,888	772,015	370,919	358,106	84,163
Kiangsu	2,768,781	2,242,475	1,920,849	1,637,590	1,542,345
Ahekiang	675,567	506,100	326,527	529,180	346,445
Cnhwei	153,472	176,492	126,458	129,591	146,015
Kiangsu	154,406	169,846	116,190	144,451	124,322
Hupeh	1,119,326	1,007,394	1,112,053	1,350,793	1,591,688
Total	7,808,882	7,534,351	6,243,585	6,722,108	6,611,773

According to statistics recently compiled by the Association, the number of Chinese cotton mills in the country totals 73. Their distribution and detailed description about them are given below:

Province	No. of Mills	No. of Yarn Spindles	No. of Thread Spindles	No. of Looms	No. of Workers	Amount of Cotton Consumed Per Year (In *Tan*)	Amount of Yarn Annually Produced (In Bales of 400 lbs.)	Amount of Cotton Cloth Annually Produced (In Pieces of About 40 yds.)
Municipality of Greater Shanghai	24	776,388	43,108	7,398	50,555	1,669,807	470,560	2,489,753
Kiangsu	19	433,496	6,320	3,426	35,528	963,803	241,848	1,309,780
Hopei	9	282,460	7,296	1,860	21,628	683,281	194,642	964,304
Hupei	5	262,096	3,240	2,878	24,184	956,800	249,810	1,146,200
Honan	4	107,280	———	200	6,750	198,293	54,651	30,860
Chekiang	3	58,120	———	225	3,030	1,100,000	30,000	———
Shantung... ...	2	58,000	7,500	———	5,400	131,000	59,600 5,000 (Thread)	———
Anhwei	1	15,200	———	———	1,114	24,304	6,751	———
Hunan	1	40,000	———	300	2,350	100,000	28,000	———
Shansi	2	19,648	———	———	1,451	14,097	11,106	———
Liaoning	1	20,480	888	200	2,237	53,110	14,320	68,141
Kiangsi	1	25,360	———	300	1,071	42,000	11,500	———
Shensi	1	15,000	———	———	———	———	———	———
Total	73	2,113,528	68,352	16,787	156,298	4,946,495	1,377,788	6,900,038

The rate of growth of Chinese cotton mills and the relative increase of the number of spindles and looms are shown in the following table :

Year	No. of Mills	No. of Spindles	No. of Looms
1919	29	659,731	2,650
1920	37	856,894	4,540
1921	51	1,238,902	6,650
1922	64	1,593,034	7,817
1923	55	1,493,672	8,581
1924	58	1,650,004	10,461
1925	65	1,832,352	10,621
1926	67	1,982,272	11,121
1927	64	1,878,023	12,283
1928	67	1,848,131	11,350

Below is given the table showing in comparison the number of mills owned by Chinese and foreigners in China together with the number of spindles and looms installed therein :

Nationality	No. of Mills	No. of Spindles	No. of Looms
Chinese	72	2,059,088	12,901
Japanese	44	1,397,272	10,801
British	3	153,320	1,900

Note :—The figures given above in the two tables do not include those mills which have suspended operation or those spindles and looms that are in the course of installation.

SHIPPING AND SHIPBUILDING

JAPANESE DOUBLE-ACTING-ENGINED SHIP.—The Uraga Dock Co. has received an order for a 9,000-ton cargo liner to be equipped with a seven-cylinder M.A.N. double-acting two-stroke engine. The motor has cylinders 600 mm. bore with a stroke of 900 mm., and develops 4,500 s.h.p. at 117 r.p.m. Three compressorless M.A.N. four-stroke engines of 225 b.h.p. are to be supplied, driving dynamos to provide the electric power on the ship. This vessel is for the Yamashita Kisen Kaisha, Tokyo.

KURE DRYDOCK.—The world's largest drydock, capable of taking care of any super-dreadnaught afloat, was formally opened at Kure, Japan, on November 16. Officially called Kure's No. 4 drydock, the construction of this was started in 1921, in conjunction with the Navy's so-called "8-8" construction program launched in the pre-Washington Treaty days, and which program has since undergone a great change. To gauge the magnitude of the undertaking, the construction exacted the combined efforts of a huge number of workers ; close on 2,000,000 cubic feet of earth and rocks had to be excavated, which were sufficient to reclaim 30,000 *tsubo* of shore lands.

NEW GUNBOAT FOR CHINESE-NAVY.—The Ministry of Navy has completed plans for the building of a gunboat to be called the Yat Sen. The work is to be undertaken by the Kiangnan Dock and the cost is estimated at $1,200,000, one-third of which is stated to have already been raised. Construction will start when the full sum has been raised, it is stated.

PUBLIC WORKS

MODERN PIER FOR SINGAPORE.—The plans have been approved, and details are now being worked out, for the new pier which is to be built to replace Johnston's Pier, which has long been inadequate to handle the traffic from ships lying in the roads. The new pier will be an imposing structure, with a large entrance hall and loggia, and will accommodate six launches, three on each side. There will also be a ceremonial landing place at the seaward end.

The site is opposite Change Alley, half way between the present pier and the site of the former temporary Post Office. It will be approximately five or six times the size of the present pier. The dimensions are 244 feet by 90 feet. The height of the entrance archway will be 42 feet. When completed, the pier will have an imposing frontage, and the entrance will lead to a loggia with an area of 2,200 square feet.

Along the length of the new pier concrete archways will be built at intervals of eighteen feet. On either side there will be sets of steps leading down to three landing stages, with platforms to provide for the various depths of water according to the state of the tide. In the center of the pier will stand newspaper kiosks and money changers' offices.

On the right of the main entrance will be found the Passport and Monopolies Offices, and on the left the police observation post and an ambulance station. Search rooms for both sexes will be provided on either side.

The original scheme for building a new pier was mooted fifteen years ago, and successive plans have been brought forward and rejected since then. The new pier will be built entirely of reinforced concrete, and the work will take two years to complete. The estimated cost is $468,000.

CEMENT FOR PHILIPPINES.—Officials of the department of commerce and communications of the Philippines announced the completion of negotiations for the purchase of a five-year supply of cement which the insular government may need for its public works between 1930 and 1935. The deal involves expenditure by the government of from P6,500,000 to P7,500,000.

Negotiations between the insular government, through the bureau of supply and the department of commerce and communications, on one hand, and the Cebu Portland Cement Company on the other, have been going on for the last few months. The Cebu Portland Cement Company is a government-owned corporation.

NEW KANCHINGTZU COAL PIER, DAIREN :—The S.M.R. Co. has applied to Kwantung Government for permission to prolong the breakwater in project at Kanchingtzu, the site for the new coal pier from the original 700 meters to project south-southeastwards by 280 meters to deviate westwards, and also to instal a light house at its extremity. This will cost Y.1,526,000.

The coal pier itself is desired to be prolonged from the original 218 meters by 115 meters, so that the berthing accommodation may be increased from two to four steamers at a time. This will entail the outlay of Y.6,175,600.

When the proposed extensions are accomplished, the daily maximum loading capacity will be raised to 2,100 tons or 3,800,000 tons a year.

NEW COMMERCIAL HARBOR.—The Committee appointed by the Reconstruction Commission to draw up plans and select suitable sites for the construction of a big commercial harbor has now completed its task after nearly 20 months' labor. The coastal area between Kanpu and Tsapu in the Hangchow Bay, consisting of 1,960 square *li*, has been selected as the site of the new harbor. A report and detail plans, with recommendations, are now in the hands of the Reconstruction Commission and will be published in book-form for information of the public very shortly.

MEMORIAL BRIDGE, BANGKOK.—The new Bangkok Memorial Road Bridge, which is to be built across the River Chao Phya in the middle of Bangkok, will celebrate the 150th anniversary of the foundation of that City, and H.M. the King of Siam has promised to pay one half of the total cost out of his Privy Purse. In addition, he has made the City a gift of the land on the Bangkok side as the side selected was on his private property.

The contract for the construction of the bridge has been secured by Dorman, Long & Co., Ltd., of Middlesborough. The bridge consists of two approach spans, each 247 ft. long, and a two-leaf bascule span giving a clear opening of 197 ft. Provision is made for a roadway 30 ft. wide, and two footways, each 8 ft. wide, and on either side of the Bridge there will be approaches with ornamental gardens. It is estimated that the construction will contain approximately 1,100 tons of steel, and the contract price, including subsidiary work, is over a quarter of a million pounds sterling.

Tenders were called for by Messrs. Sandberg, the Engineers, from France, Denmark, Germany, Italy, America and Great Britain, so that the success of Dorman, Long & Company is particularly gratifying to British Engineers.

Representatives of the contractors have arrived in Bangkok. The bridge is to be completed and ready for the official opening on April 1, 1932.

TELEPHONE, TELEGRAPH AND RADIO

OSAKA WANTS DIRECT COMMUNICATION WITH SHANGHAI.—A project is now afoot for the construction of a wireless station in the neighborhood of Osaka for the exclusive purpose of exchanging radio messages between Osaka and Shanghai.

The proposal has been put forward by Osaka merchants who are keenly interested in the China trade and who are feeling inconveniences in their trade with Shanghai merchants due to lack of complete and speedy means of communication with that part of China.

The matter was approved at the recent committee meeting of the Osaka Chamber of Commerce and Industry, which has drawn up a resolution to urge the authorities concerned to realize the project under contemplation.

It is said that a deputation will shortly be sent to Tokyo to approach the Government to consider the matter.

F. M. S. TELEPHONES.—At a meeting of the Federal Council the Chief Secretary moved the authorization of the appropriation of $1,000,000 from money borrowed under the authority of the Straits Settlements Loan Enactment, 1921, for expenditure by the Post and Telegraphs Department on telegraph and telephone development in 1930.

PHILIPPINE TELEPHONE SYSTEM.—Plans for the extension of the service of the Philippine Long Distance Telephone Company to all the principal towns in Luzon and the Visayan islands were revealed following the arrival of Theodore V. Halsey, president of the Philippine Telephone and Telegraph Company, the Philippine Long Distance Telephone Company and the Negros-Iloilo-Panay Telephone Company.

According to Mr. Halsey the telephone companies of which he is the head will try to connect all the provinces in Luzon with a general long-distance system that will allow a man in Baguio to speak through the telephone with a person in Negros.

NEW RADIO STATIONS.—It is learned that all necessary equipment and apparatus for the construction of two powerful radio stations in Shanghai, which were ordered by the Ministry of Communications from Germany have now arrived and work on the construction of the stations will be started immediately so that direct radio communication between China and various European and American countries will be possible by next spring.

Representatives of British, American and German communication interests are understood to be in Shanghai expecting soon to enter into negotiations with the Ministry of Communications to formulate a program for the transmission of radio messages between China and the various countries concerned.—*Kuo Min.*

MUKDEN-AMERICA RADIO SERVICE.—The communications authorities of the Three Eastern Provinces are ready to commence work on the installation of radio equipment to communicate direct with America.

This station will be of the 20 kilowatt shortwave RCA type.

Mr. Cecil Bailey, installation engineer of the Radio Corporation will have charge of the work.

NEW TELEPHONE SERVICES.—It is announced at the Ministry of Communications that preparations for the installation of a Kiangsu-Chekiang inter-provincial telephone service connecting Shanghai with Hangchow have been begun jointly by the Provincial Reconstruction Departments of Kiangsu and Chekiang, in accordance with previous arrangements made with the Ministry. To facilitate the early completion of the line, work will be started simultaneously at both Shanghai and Hangchow. The Shanghai-Fengching section of the service in Kiangsu will be the first to be completed, and will be in operation by the end of the year.

It is learned at the Commander-in-Chief's Headquarters that a direct military telephone line connecting Nanking, Chinkiang, Changchow, Wusih, Soochow, Kunshan, Shanghai and Hangchow will shortly be installed by the Communications Department of the Headquarters to facilitate transmission of military orders and reports.

ROADS

TOKYO-OSAKA MOTOR ROAD IS PROJECTED.—Mr. Daishiro Fukusawa is promoting a Y.80,000,000 toll motor highway connecting Tokyo and Osaka. The scheme calls for maintaining regular high class motor bus service, beside allowing private cars using the road at fixed rates. The project is not in conflict with the National Railway law, which consideration encourages the impression that the railway authorities may become well disposed to the motor highway plan.

AVIATION

VOUGHT-CORSAIR MACHINES BOUGHT BY CHINA.—The Nationalist government aeronautical bureau placed a rush order for twelve Vought-Corsair military airplanes for possible use in the present civil war.

The machines are scheduled to be shipped from New York at the earliest possible date. The order totals $400,000. It is expected that twelve more machines will be purchased later.

JAPAN DRAWS PLANS FOR AIR PORT.—A large airport for land and seaplanes will be built by the Ministry of Communications between Tokyo and Yokohama. An appropriation of Y.3,300,000 was made in the last session of the Diet for this purpose, and preliminary plans have been drawn up.

It is revealed that the airport will be located along the seashore about half way between Tokio and Yokohama in the district known as Haneda.

The area of land to be purchased is approximately 133 acres.

Preliminary plans do not include the erection of a Zeppelin hangar, although it is expected that this will be included when additional funds are obtained.

The airport will be under the Ministry of Communications and will be used by the army, navy and such private individuals and companies as comply with the government air regulations.

JAPANESE BUILT PASSENGER PLANE.—A passenger aeroplane manufactured in Japan, belonging to the Japan Air Transportation Company, made an experimental flight from Kobe to Tokyo on December 5. The aeroplane which has capacity to carry ten passengers, and which will be used on the Fukuoka-Shanghai route from April next year, is scheduled to fly from the seaside of Ohmori to Fukuowa at 7 a.m. on December 8, being expected to cover the distance of 9,800 kilometres at full speed. If this aeroplane succeeds in the attempt, it will be put on the Fukuoka-Shanghai route, to cover about 9,500 kilometres, beginning from April, 1930.

MOTOR CARS AND TRUCKS

INDIAN GOVERNMENT ORDER FOR ALBIONS.—One of the largest contracts ever placed for heavy motor transport has just been secured by the Albion Motor Car Co., Ltd., the well-known Scottish commercial vehicle manufacturers. The order is for 223 rigid six-wheelers, and the total value of the contract is well on for a quarter of a million pounds sterling.

KUCHING, BORNEO, BUYS A FIRE-ENGINE.—Morris-Commercial Cars, Ltd., have just supplied a standard Morris-Commercial Fire-Engine, of 250/400 gallon capacity, to Kuching, Borneo.

BUILDINGS

CANTON CEMENT FACTORY.—Part of the machinery for the Government cement factory in Sai Tsoon in the western outskirts of Canton has arrived in Hongkong from Copenhagen, Denmark, and is being transhipped to Canton. The whole order is being handled by Manners & Co., of Shameen, and the cost of getting it to Canton, including insurance, etc., will be over a thousand dollars, Hongkong currency. The contract for the construction of this factory was given to Smidth & Co., Copenhagen.

Under the direction of Mr. Tang Tsic Yi, work has been going on for the past several months. The Canton-Hankow Railway is to run a track from its Sai Tsoon Station to the factory site to facilitate transport of raw materials, such as limestone and clay, from the North River districts. The factory is expected to be in operation by the end of 1930, or the beginning of 1931. It is estimated that the output will be in the neighborhood of 1,200 barrels of cement per day.

SULZER
BROTHERS

SHANGHAI ENGINEERING OFFICE
4 AVENUE EDWARD VII.

Telegraphic Address
"SULZERBROS" SHANGHAI
Telephone 16512

蘇爾壽工程事務所
上海愛多亞路四號
本公司常備樣本供奉各界
垂詢工程事務亦局誠酬答

160-BHP Airless Injection
Two-Cycle
Sulzer Marine Diesel Engine
With Built-In Reversing
Gear and Thrust Bearing

Special Advantages
Utmost Simplicity
Easy Attendance
Compact Design
Reduced Weight
Extra Low Lubricating Oil
Consumption

Uniflow Steam Engines, Air and Gas Compressors, Upright Watertube Boilers, Cornish and Lancashire Boilers, High and Low Lift Centrifugal Pumps, Fans and Ventilators for all purposes, Fire Engines, STATIONARY AND MARINE DIESEL ENGINES, AIRLESS INJECTION DIESEL ENGINES, Ice-making and Refrigerating Plants, Maag Gears and Maag Planing Machines.

WINTERTHUR. SWITZERLAND.